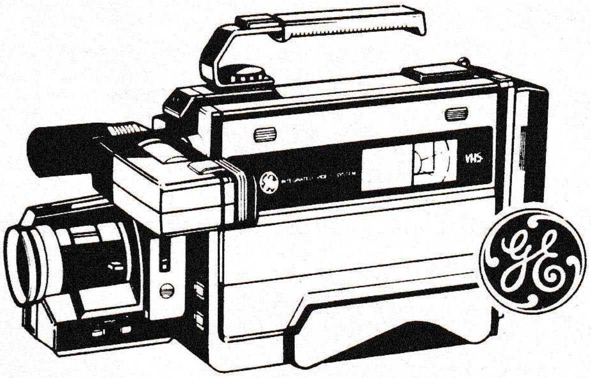
GENERAL ELECTRIC

VHS MOVIE CAMCORDER

SERVICE INFORMATION

1CVM6060E

MODEL INFORMATION FOR 1CVM6060E



VHS CAMCORDER

Model 1CVM6060E is a Camera-Recorder combination that is compatible with all VHS equipment. It can record in the SP mode using a standard ½″ VHS tape cassette. It features automatic focus, power zoom (6:1), 10 lux low light sensitivity, and an F1.2 lens. The camera pickup tube is an advanced design ½″ Newvicon.

The 1CVM6060E can operate in excess of 90 minutes on a single battery charge. Its approximate power consumption is 14 watts and its weight is only 7.5 pounds.

ACCESSORIES

The following accessories are supplied with this model:

Battery Pack	1CVA135
Remote Control	EW90X143
Handle	EW90X144
Audio/Video Output Adaptor	EW90X147
VHF Connecting Cable	EW8X144
300-75 OHM Transformer	EP90X40
Audio/Video Cable	EW8X240
Battery Charging Cord	EW90X60
Earphone	EW90X118
Shoulder Strap	EW90X145
Shoulder Pad	EW90X146
AC Adaptor	1CVA125*

* See Section 6 of this manual for service information.

The following optional accessories may be purchased for this model:

Carry Case	1CVA245
Car Cord	1CVA345

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IMPORTANT SAFETY INFORMATION

1. When servicing, observe the original lead dress. If a short circuit is found, replace all parts which have been overheated or damaged by the short circuit.
2. After servicing, see to it that all the protective devices such as insulation barriers and insulation papers shields are properly installed.
3. After servicing, make the following leakage current checks to prevent the customer from being exposed to shock hazards.

LEAKAGE CURRENT COLD CHECK

1. Unplug the AC cord of the unit supplying the power to the camera and connect a jumper between the two prongs on the plug.
2. Plug the camera cable into this unit.
3. Measure the resistance value, with an ohmmeter, between the jumpered AC plug and each exposed metallic cabinet part on the camera such as screwheads, connectors, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be between 1MΩ and 5.2MΩ.
   When the exposed metal does not have a return path to the chassis, the reading must be infinity.

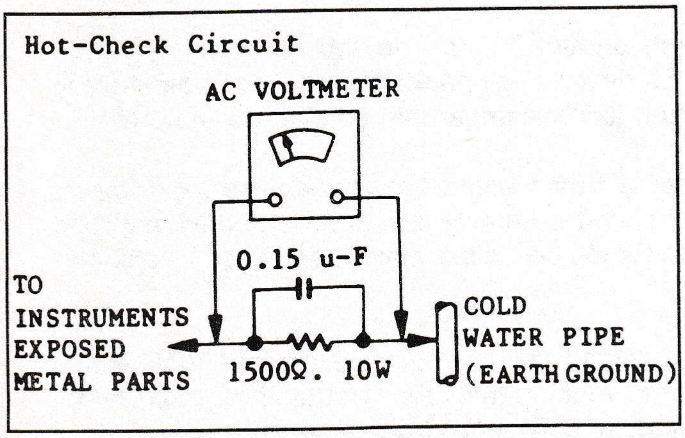
Hot-Check Circuit
AC VOLTMETER
0.15 u-F
TO INSTRUMENTS EXPOSED METAL PARTS
1500Ω. 10W
COLD WATER PIPE (EARTH GROUND)

Figure 1

LEAKAGE CURRENT HOT CHECK (See figure 1)

1. Plug the AC cord of the unit supplying power to the camera directly into the AC outlet. Do not use an isolation transformer for this check.
2. Connect a 1.5kΩ 10 watt resistor, in parallel with a 0.15μF capacitor, between each exposed metallic part on the unit and a good earth ground such as a water pipe, as shown in figure 1.
3. Use an AC voltmeter, with 1000 ohms/volt or more sensitivity, to measure the potential across the resistor.
4. Check each exposed metallic part, and measure the voltage at each point.
5. Reverse the AC plug in the AC outlet and repeat each of the above measurements.
6. The potential at any point should not exceed 0.75 volts RMS. A leakage current tester (Simpson Model 229 or equivalent) may be used to make the hot checks, leakage current must not exceed ½ milliamp. When a measurement is outside the limits specified, there is a possibility of shock hazard, and the equipment should be repaired and rechecked before it is returned to the customer.

X-RADIATION

1. The potential source of x-radiation in electronic viewfinder is the high-voltage section and picture tube.
2. It is important to use a periodically checked and accurate high-voltage meter, to monitor and check the high voltage.
   Rotate the brightness control and contrast fully counterclockwise for this test.
3. Observe that the high voltage does not exceed the specified value. Excessive high voltage may cause a possible x-radiation hazard. The camera system should be repaired as soon as possible.
4. It is essential to use the specified picture tube to avoid a possible x-radiation hazard.

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine (GE) replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes. Critical parts are marked with ⚠ in the schematic diagram and circuit board diagaram and with * in the parts list.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

ELECTROSTATICALLY SENSITIVE (ES) DEVICES

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.

3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.

4. Use only an anti-static solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.

5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.

6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).

7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed. CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device).

GENERAL ELECTRIC

1CVM6060E

VHS MOVIE CAMCORDER

SERVICE INFORMATION

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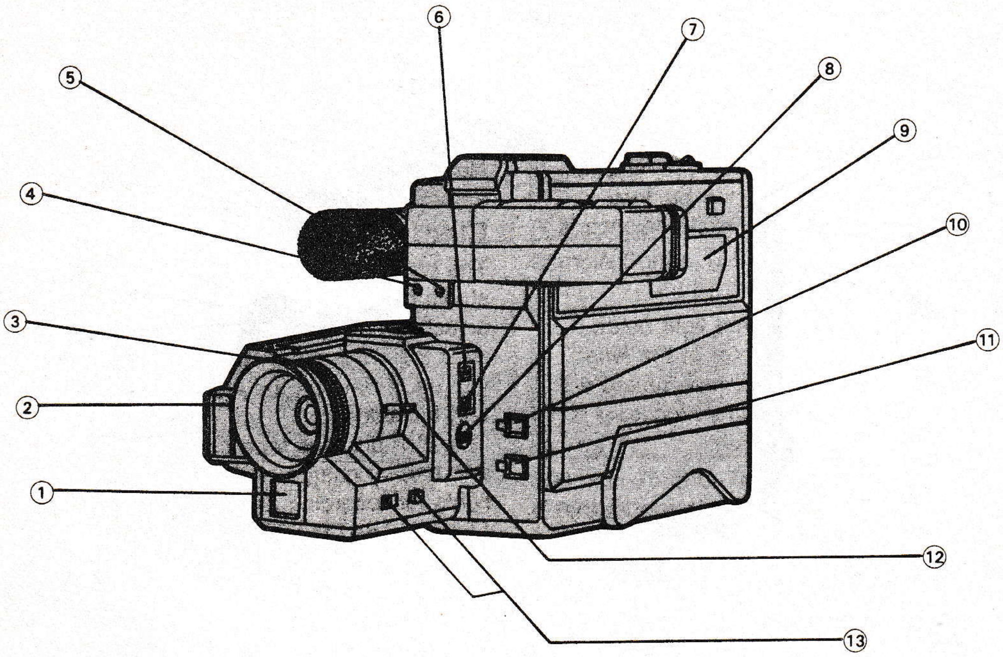
SPECIFICATIONS

Power Source:	VHS Movie: DC 12V AC Adaptor: 110/120/220/240V AC 50/60 Hz
Power Consumption:	VHS Movie: 12V DC 14W AC Adaptor: 37W
Television System:	EIA Standard (525 lines, 60 fields) NTSC color signal
Video Recording System:	4 rotary heads, helical scanning system Luminance: FM azimuth recording Color signal: converted subcarrier phase shift recording
Audio Track:	1 track
Tape Format:	Tape width 1/2 inch (12.7 mm), high density tape
Tape Speed:	1-5/16 i.p.s. (33.35 mm/s) in SP mode
Record/Playback Time:	160 min. with T160 used in SP mode
FF/REW Time:	Less than 10 min. with T120
Camera Tube:	One 1/2" integrated, stripe filter electrostatic focusing, magnetic deflection, separate mesh, Special Newvicon tube, type S4161
Focus:	Electro-Static Type
Lens:	6:1 Zoom Lens. Auto iris: closed with power off. Auto Zoom Lens and Macro construction. Auto focus system. F: 1.2 f: 9mm – 54mm, Lens filter diameter: 49mm
Electronic Viewfinder:	Monochrome 1/2 inch CRT, built-in
Minimum Light Intensity on optical image:	10 Lux (F1.2) 1 footcandle
Optimum Light Intensity on optical image:	1500 Lux 150 footcandles
External Microphone Input Level:	–70 dB, 600 ohm unbalanced, M3 connector
Operating Temperature:	32°F~104°F (0°C~40°C)
Operating Humidity:	10%~75%
Weight:	7.7 lbs. (3.5 Kg) (with battery pack)
Dimensions:	6-1/8" (W) ×7-1/2" (H) ×13-3/4" (D) 155 (W) ×192 (H) ×351 (D)mm

Weight and dimensions shown are approximate.
Designs and specifications are subject to change without notice.

CONTROLS – LOCATION & FUNCTION



① **Distance Detection Window**
This window is used to detect subject to camera distance for the automatic focus feature.

② **Lens Hood**
Shields camera lens and accepts lens cap to protect lens.

③ **Lens Focus Ring**
Rotate this ring to manually focus the picture when the Focus switch is in the MANUAL position.

④ **External Microphone Jack**
You may connect an external microphone to permit audio pick-up closer to the subject. The built in microphone is automatically disconnected when an external microphone with 600 ohm impedance is plugged-in.

⑤ **Earphone Jack**

⑥ **Automatic White Balance Switch (AWB)**
Along with light source selection, a proper white balance setting is necessary for proper color reproduction. When the switch is set to AUTO, the White Balance is automatically adjusted. Set to FIXED for special situations.

⑦ **Indoor/Outdoor Switch**
Compensates for changes of light source types.

⑧ **Color Control Knob**
Allows changing of color values (red/blue) by pressing the Color Control Knob with the index finger and turning when the AWB switch is set to FIXED.

⑨ **Video cassette holder**

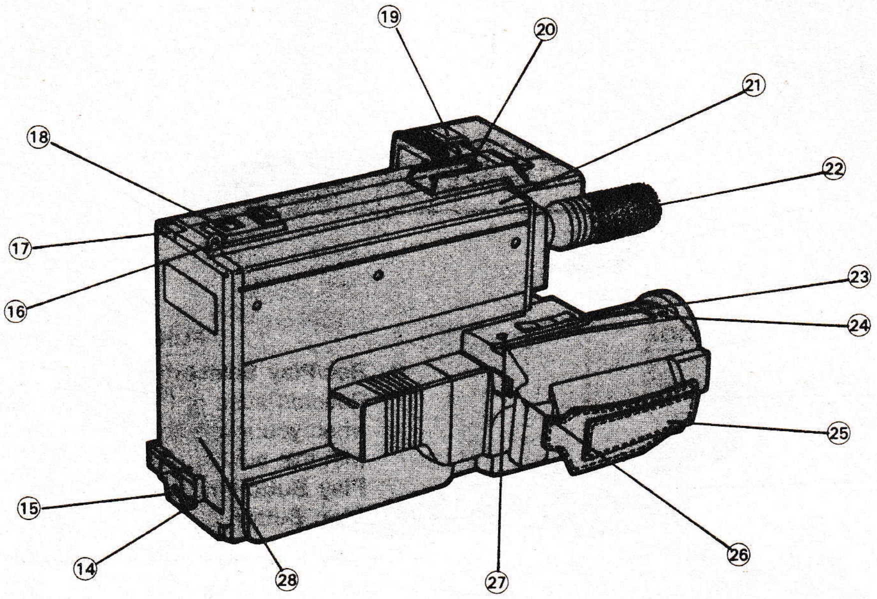
⑩ **Standby Button (and indicator)**
When the button is set to standby it keeps the camera ready to record, using minimum battery strength.

⑪ **Power Button**

⑫ **Zoom Lever with Macro Button**
Use this lever to manually zoom the picture in or out. The Macro button is used to set the zoom lever to the macro position for close-up photography.

⑬ **Auto Focus switch/button**
In the MANUAL position, push and hold this button for auto focusing. Push and slide the switch to AUTO for continuous auto focusing.

CONTROLS – LOCATION & FUNCTION



⑭ **Adaptor Connector for AC Adaptor (1CVA425)**

⑮ **Remote Jack**

⑯ **Shoulder Strap Hook**

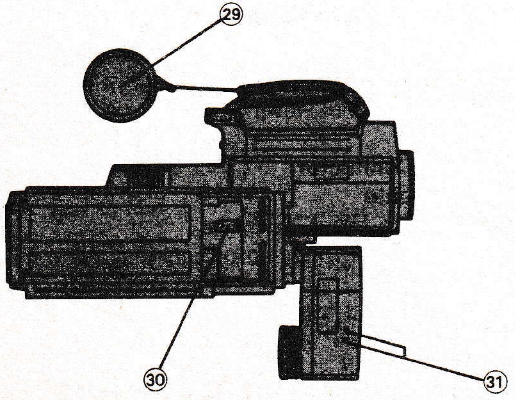
⑰ **Battery Release Button**

⑱ **Eject Control**
Push this control to remove or to insert the video cassette.

⑲ **Electronic Viewfinder**

⑳ **Accessory Mount**
Convenient mounting facility for a handle (supplied) or optional quartz lights.

UNDER SIDE



㉑ **DATE/DISPLAY & Function Control Panel**

㉒ **Microphone**

㉓ **Power Zoom Control**
This control allows you to “zoom-in” (Telephoto or T) or “zoom-out” (Wide Angle or W) the picture you are recording.

㉔ **Quick Review Button**
Push this button to playback the last few seconds of your recording.

㉕ **Grip**

㉖ **Record/Pause Button**
Push this button to start or pause camera recording.

㉗ **Backlight Button**
Push to increase the amount of light to improve scenes where the subject is darker than the surrounding scene.

㉘ **Battery Panel**

㉙ **Lens Cap**

㉚ **Tripod Mounting Hole**

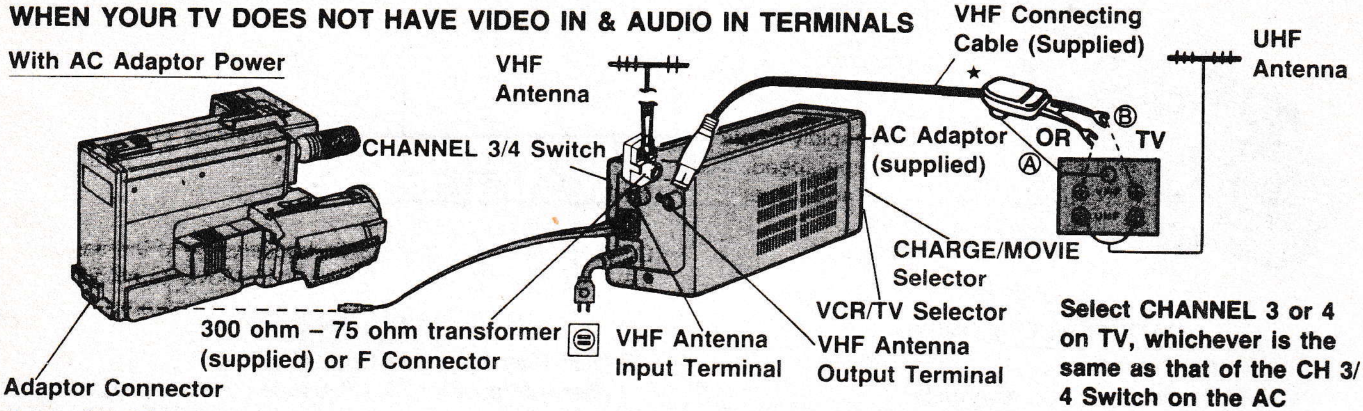
㉛ **Brightness Control/Focus Control**
These controls adjust the brightness and focus of the viewfinder picture.
Note: These controls have been set at the factory. It is not necessary to adjust these controls under normal circumstances. But, should it become necessary it is recommended that you use a plastic screwdriver and make the adjustment with caution so as not to damage the miniature controls.

HOW TO CONNECT TO A TV

The VHS Movie may be connected to a TV. This allows you to view your tapes in their final program form, while you are recording them, or any time later.

WHEN YOUR TV DOES NOT HAVE VIDEO IN & AUDIO IN TERMINALS

With AC Adaptor Power


VHF Connecting Cable (Supplied)
★
UHF Antenna
VHF Antenna
CHANNEL 3/4 Switch
AC Adaptor (supplied)
OR
Ⓑ
Ⓐ
TV
CHARGE/MOVIE Selector
VCR/TV Selector
VHF Antenna Output Terminal
VHF Antenna Input Terminal
300 ohm – 75 ohm transformer (supplied) or F Connector
Adaptor Connector

Select CHANNEL 3 or 4 on TV, whichever is the same as that of the CH 3/4 Switch on the AC Adaptor.

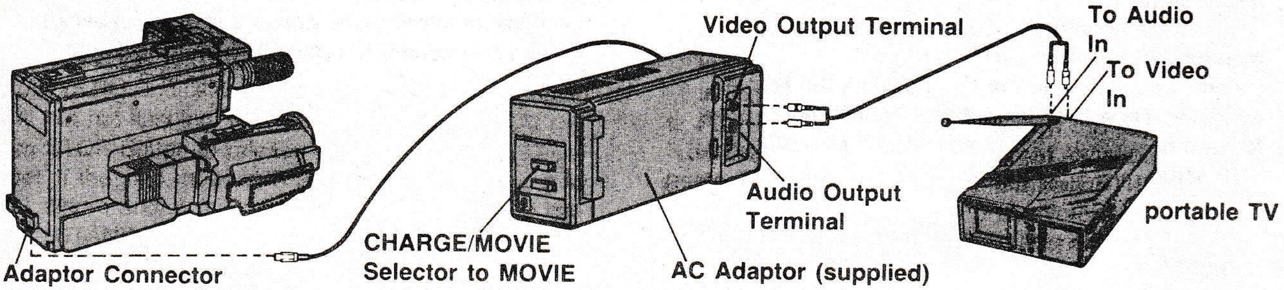
Note: ON AC ADAPTOR

- During playback with AC Adaptor power, be sure the VCR/TV selector is set to "VCR".
- Be sure that the CHARGE/MOVIE Selector is set to MOVIE.

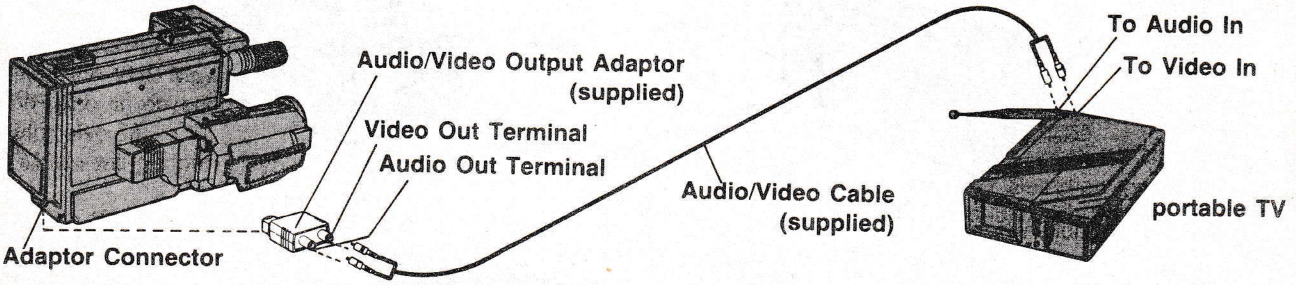
★ If you have the alternate switch on your VHF Connecting Cable set switch to 75Ω for connection Ⓐ or set switch to 300Ω for connection Ⓑ.

WHEN YOUR TV HAS VIDEO IN & AUDIO IN TERMINALS

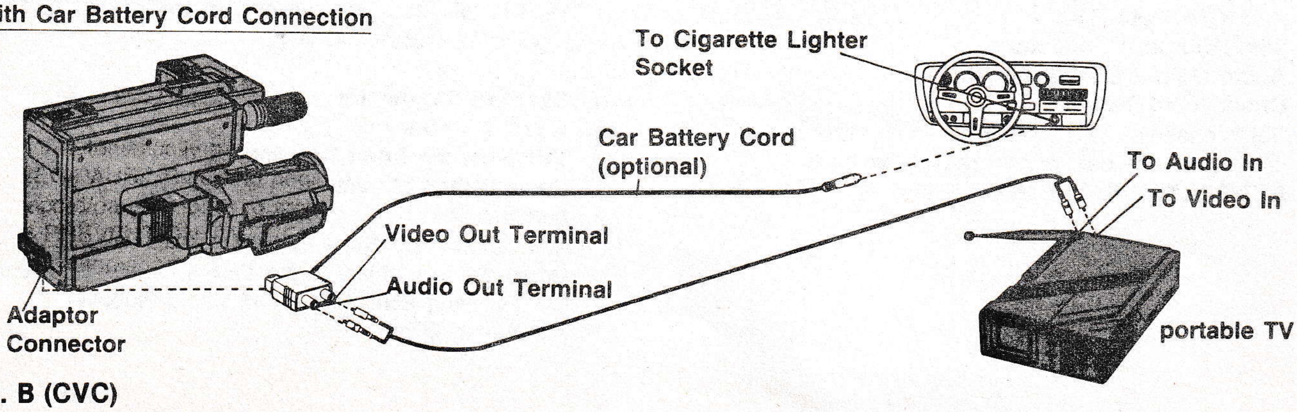
With AC Adaptor Power



With Battery Power



With Car Battery Cord Connection



1-1. DISASSEMBLY FLOWCHART

This flowchart indicates disassembly steps of the cabinet parts and the P.C. Boards in order to find the items necessary for servicing.
When reassembling, perform the steps in the reverse order.

Note:
a. When removing the cabinet, work with care so as not to break the locking portions.

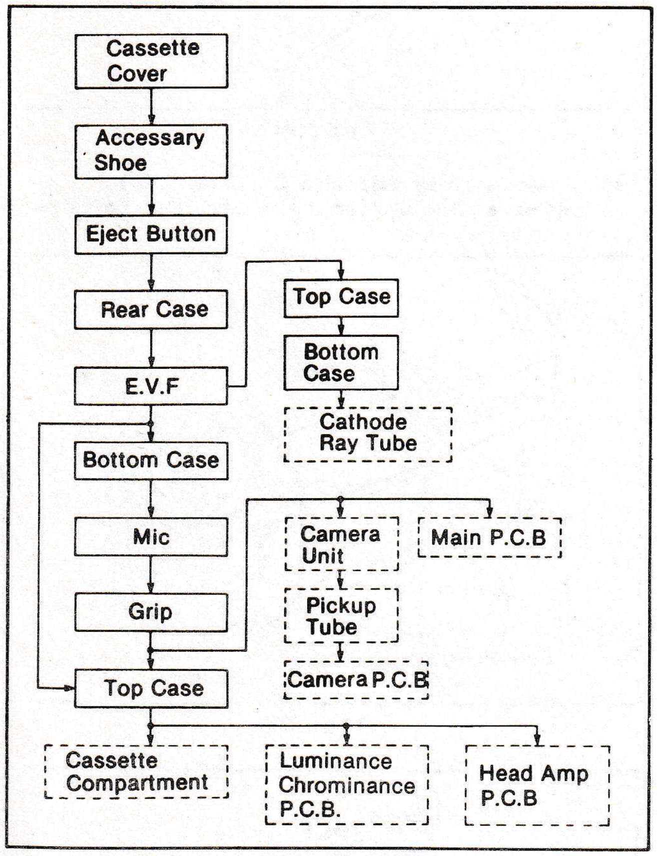


Fig. D1

1-2. DISASSEMBLY METHOD

Notes:
a. Place the cloth or any other soft materials under the P.C. Boards or unit for prevention them being damaged while servicing.
b. When reinstalling, ensure the connectors are connected and any electrical components are not damaged.
c. Do not supply power to the unit during working.

1. Removal of the Cassette Cover

(1) Remove 2 rubber covers and 2 screws (A). Then carefully lift and pivot the front portion to remove.
Pay attention so as not to damage the locking portions (B).

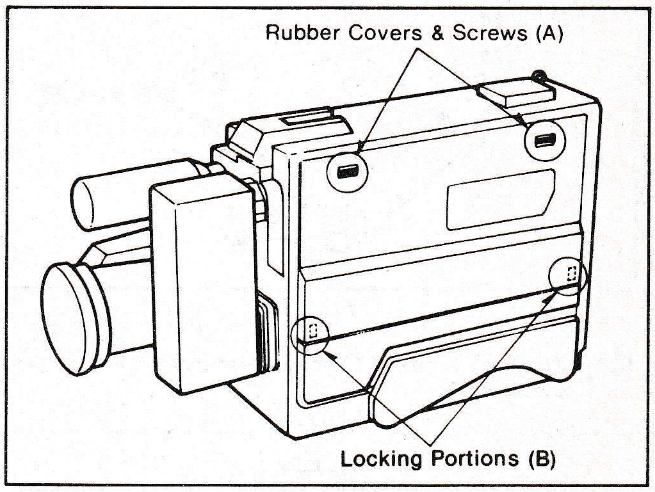


Fig. D2

2. Removal of the Accessary shoe

(1) Remove 1 screw (C) and spring for shoe.
(2) Remove 2 screws (D) and shoe.

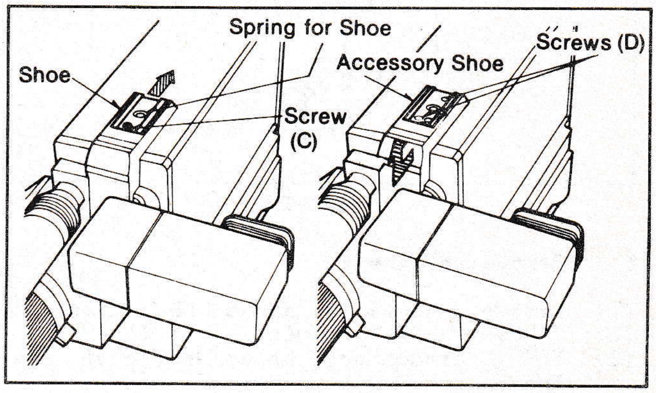


Fig. D3

3. Removal of the EJECT Button

(1) Remove 1 screw (E).

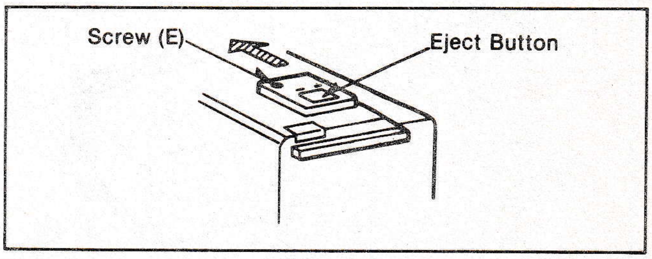


Fig. D4

4. Removal of the Rear Case

(1) Remove 4 screws (F) and pull the (G) portion of the Rear case, and push the (H) portion.

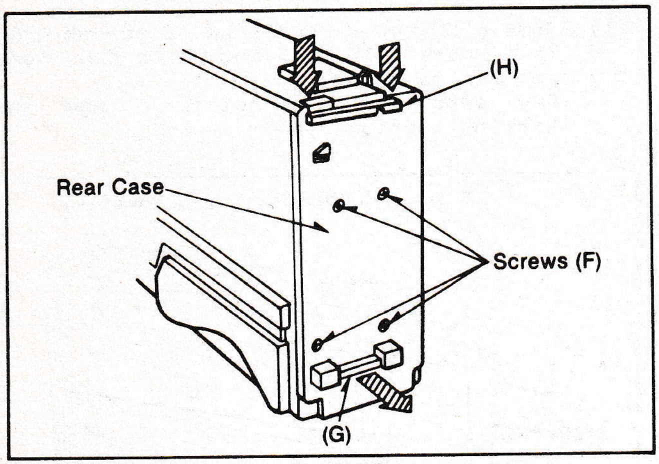


Fig. D5

(2) Remove screw (I) then remove the Battery Catcher.

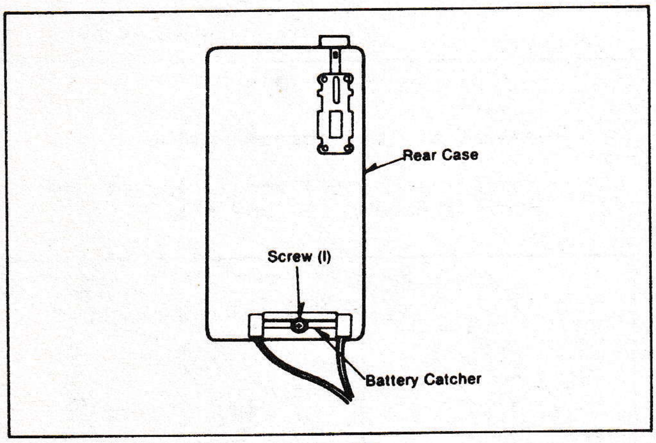


Fig. D6

5. Removal of the EVF

(1) Remove a screw (J) and a GND jumper.
(2) Remove the E.V.F unit.
(3) Then, disconnect the connector of the EVF.

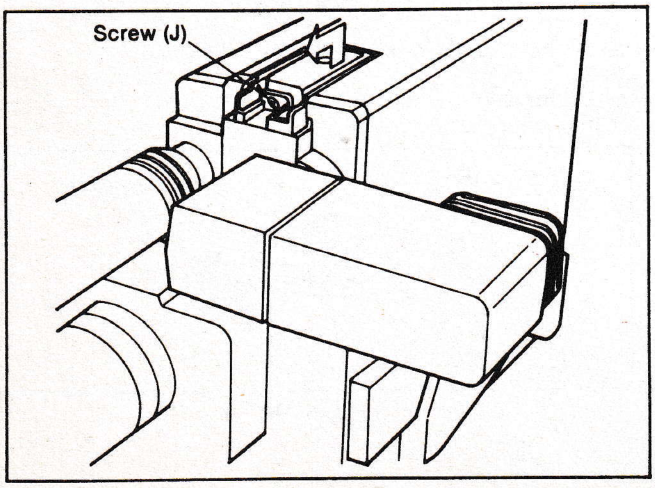


Fig. D7

6. Removal of the Top case and Bottom case of the EVF.

(1) Remove a screw (K).
(2) Remove a ring (L) and Front Panel unit.

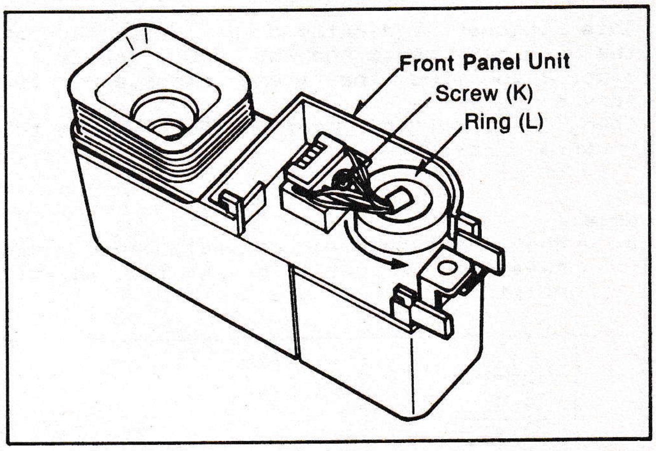


Fig. D8

(3) Remove ring (M) and 3 screws (N).
Remove the Bottom case and the Top case.

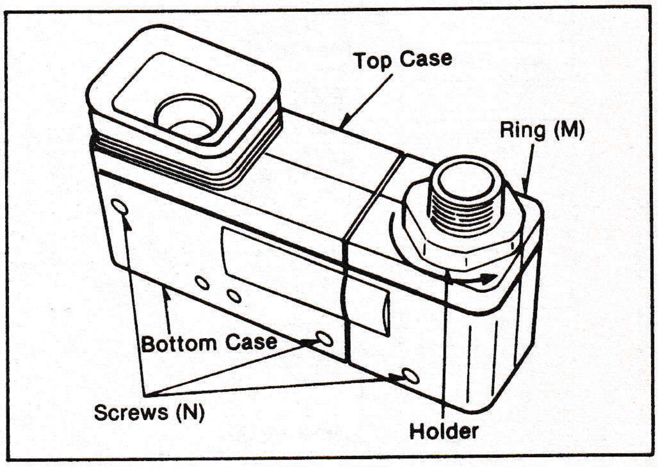


Fig. D9

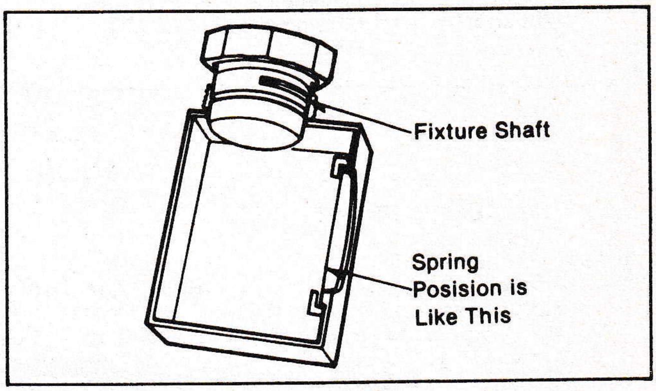


Fig. D10

Note:
a. When reinstalling, be careful of spring and position of fixture shaft.

7. Removal of the cathode ray tube

(1) Disconnect the CRT socket and remove the rubber (CRT fixing).

(2) Loosen screw (O) and remove the CRT.

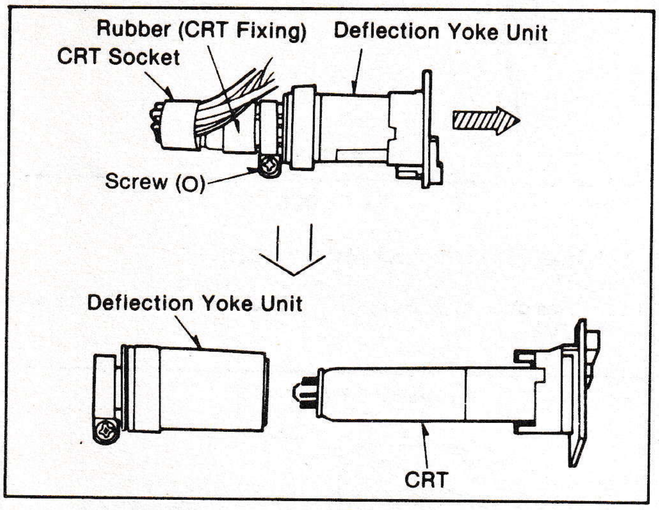


Fig. D11

Note:

a. When reinstalling or changing of a C.R.T. , connect E.V.F. connector and turn on the power SW before casing (pay attention not to touch to any parts.) Then adjust the deflection yoke so that the monitor of the C.R.T. becomes horizontal position and fix it by adhesive tape.

8. Removal of the Bottom Case and Mic

(1) Remove 2 screws (P) and remove the Grip Separate piece.

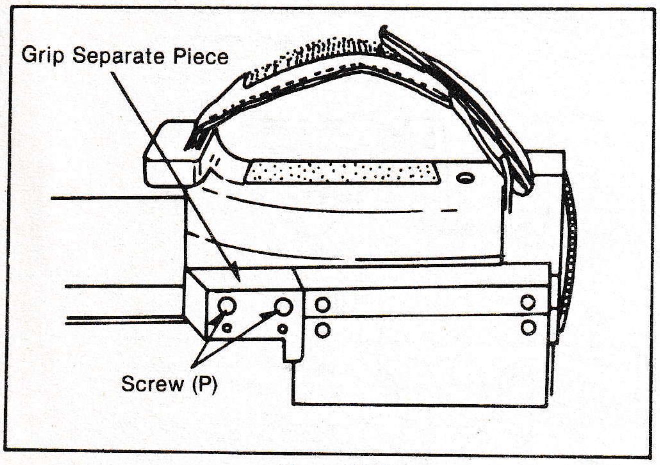


Fig. D12

(2) Remove 9 screws (Q) and remove the Bottom case with Mic.

(3) Disconnect the Mic connector.

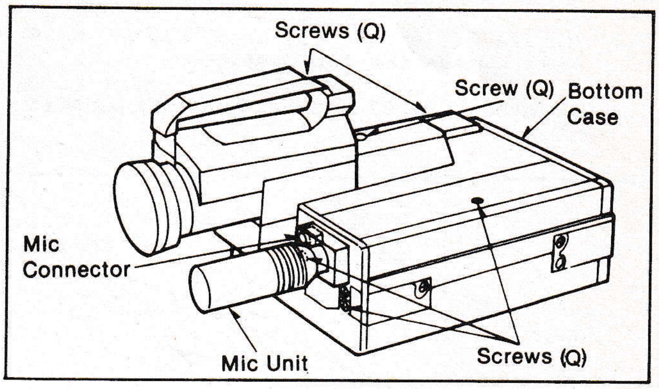


Fig. D13

(4) Remove the Mic unit from the Bottom case.

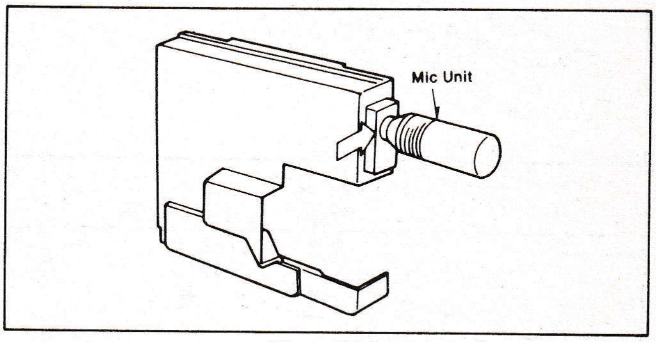


Fig. D14

9. Removal of the Grip

(1) Remove 3 screws (R).

(2) Remove the Grip case unit and disconnect the connectors P801, P802 and P803.

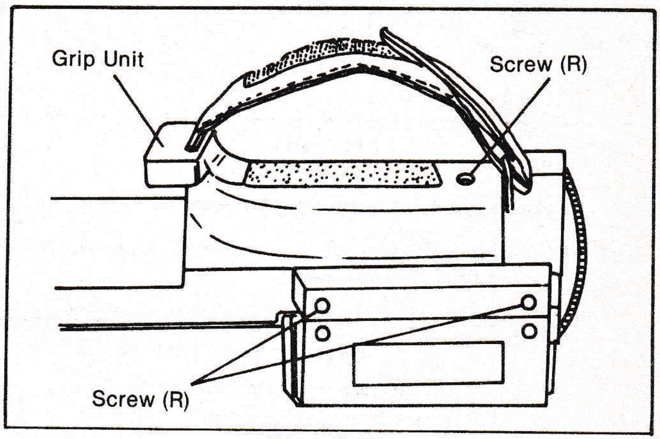


Fig. D15

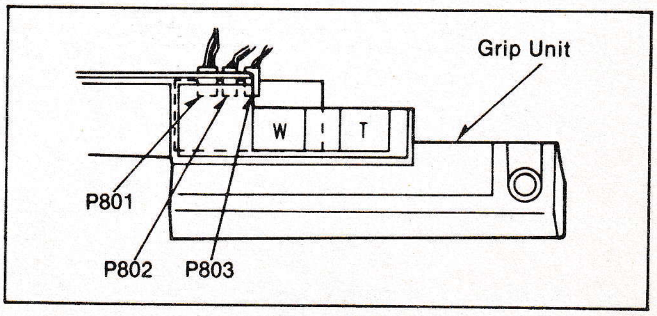


Fig. D16

10. Removal of the Top Case

(1) Remove 3 screws (S) on the Top case. Then remove the Top Case.

(2) Disconnect P1507 and remove the operation P.C.B.

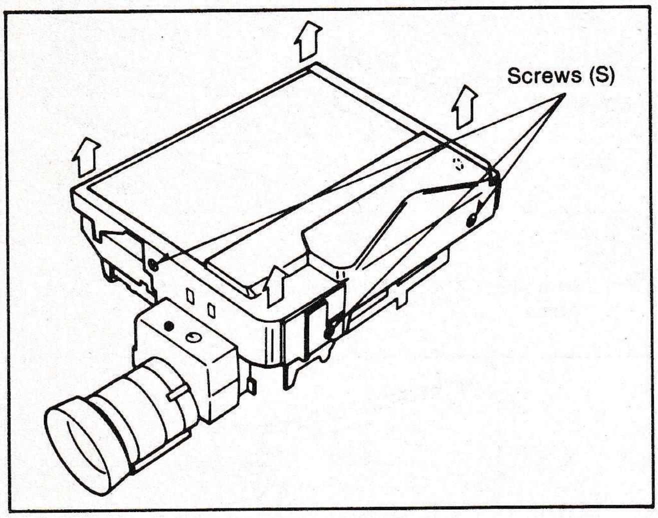


Fig. D17

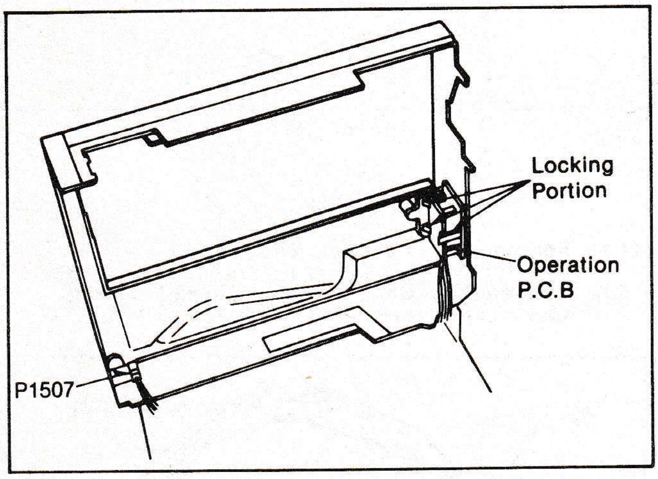


Fig. D18

11. Removal of the cassette compartment

(1) Remove 4 screws (T). Then remove the cassette compartment.

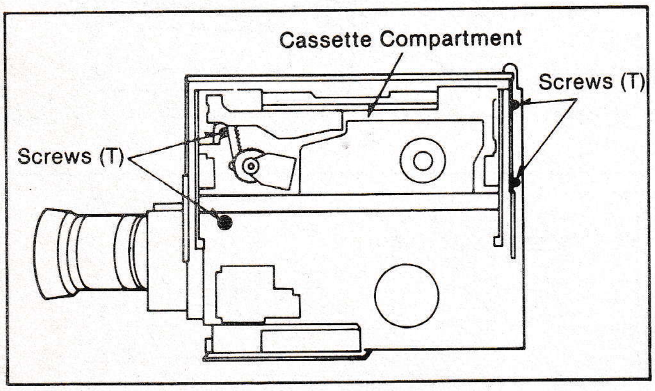


Fig. D19

(2) Remove 2 screws (U) and then remove the takeup and supply photo Tr P.C.B.

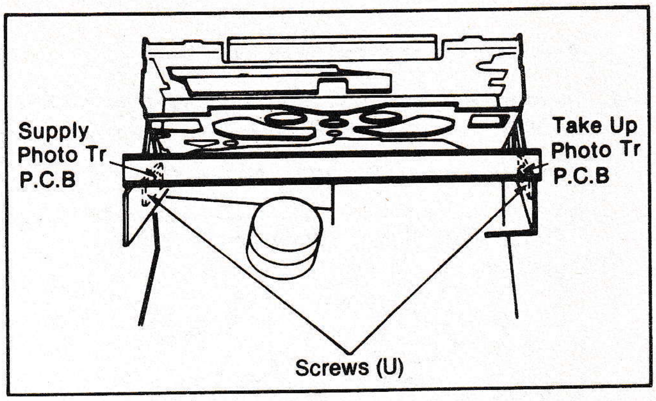


Fig. D20

12. Removal of the Main P.C.B.

(1) Remove the Barrier then remove 3 screws (V).

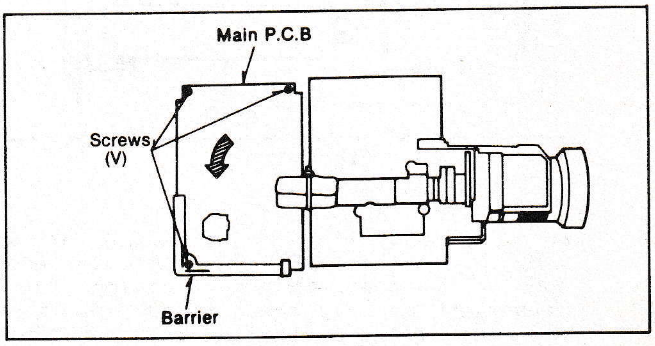


Fig. D21

13. Removal of the Luminance/Chrominance P.C.B.

(1) Remove 3 screws (W). After remove the P.C.B from the deck, remove the other 2 screws (X).

(2) Disconnect P3003, P3004, P3001 and P3002.

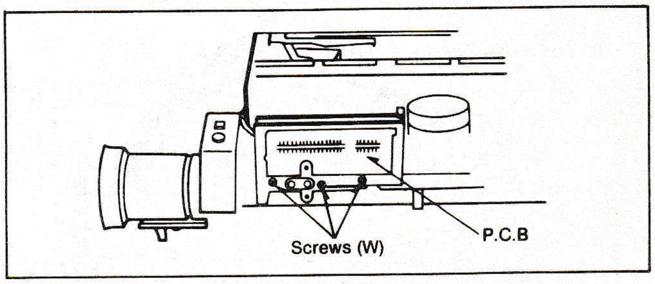


Fig. D22

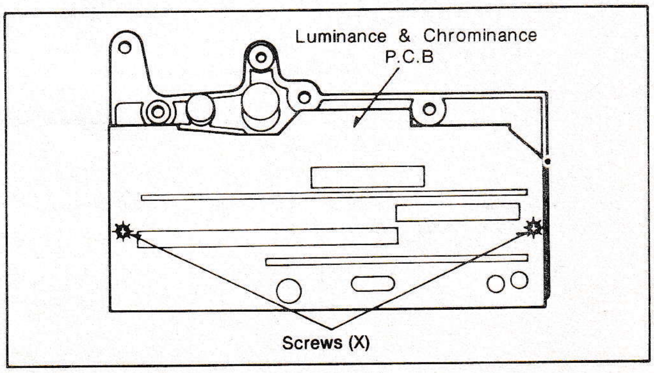


Fig. D23

14. Removal of the Head Amp unit

(1) Remove 2 screws (Y) then remove the Head Amp unit from the deck.

(2) Disconnect P5001, P5002 and P5003.

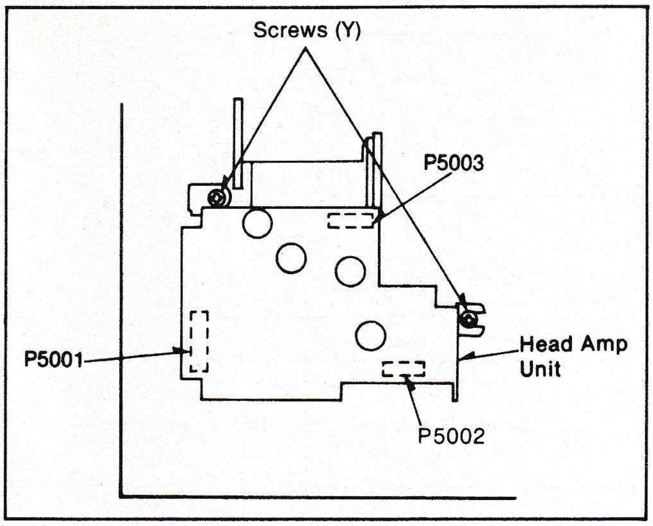


Fig. D24

15. Removal of the Camera unit

(1) Remove 5 screws (Z), and disconnect the P601.

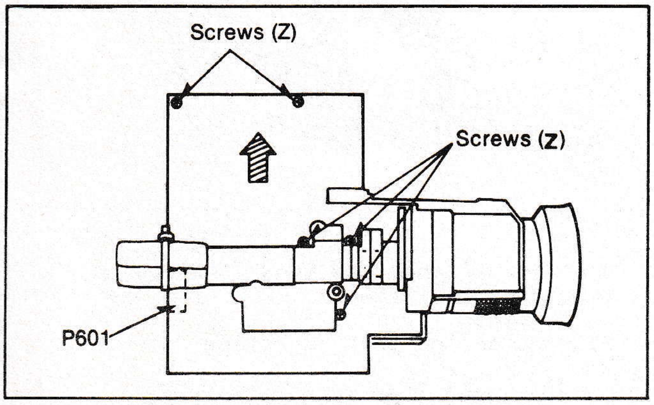


Fig. D25

16. Removal of the Camera P.C.B.

(1) Remove 2 screws (a).

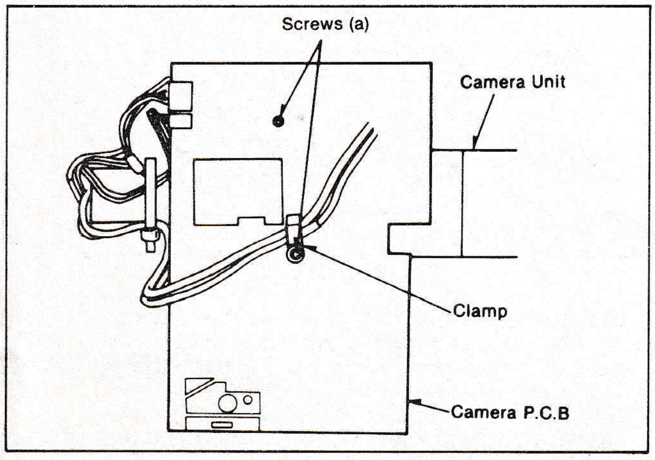


Fig. D26

2 REPLACEMENT

2-1 REPLACEMENT OF PICKUP TUBE

1. REMOVAL OF THE PICKUP TUBE

(1).Remove the camera unit from the VTR unit.
(Refer to the DISASSEMBLY SECTION)
(2).Unscrew 4 screws (A) and (B), and remove the shield cover.

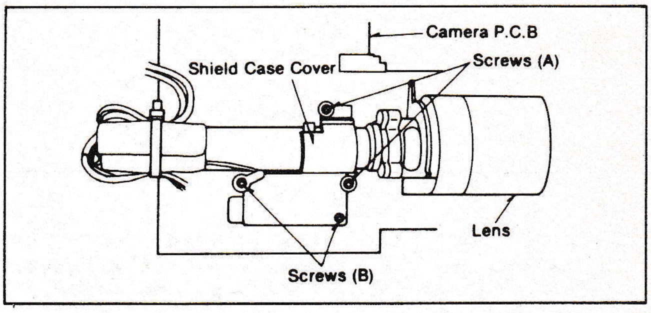


Fig. R1

(3).Unsolder the target lead.

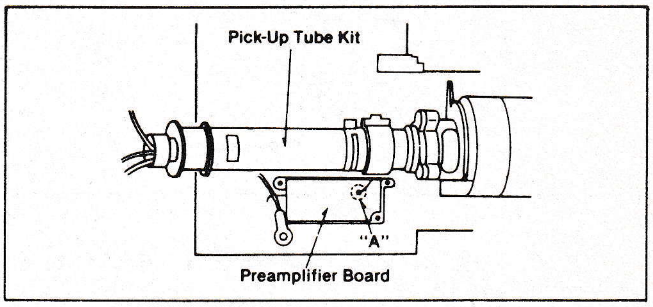


Fig. R2

(4).Disconnect the pickup tube socket and bias light assembly by pulling them backward.
(5).Remove the Filter assembly.
(6).Loosen the clamp screw (C) and remove the pickup tube from the deflection yoke assembly.

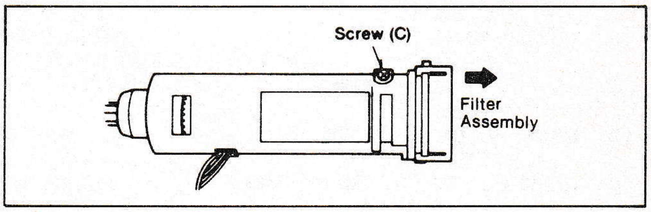


Fig. R3

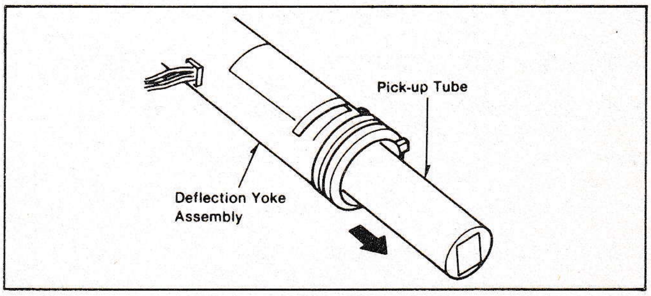


Fig. R4

Note:
Do not touch the pickup tube surface when removing.

2. INSTALL OF THE PICKUP TUBE

(1).Install the new pickup tube in the deflection yoke assembly.

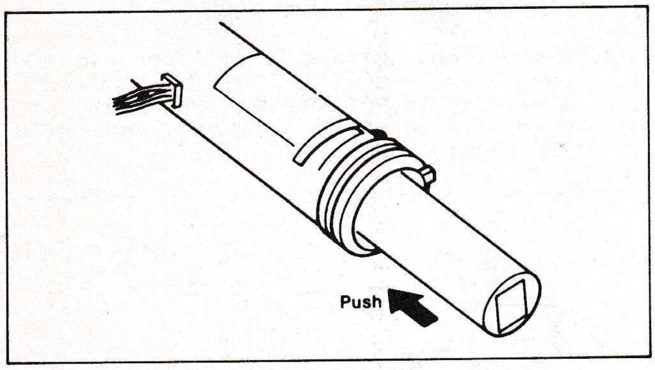


Fig. R5

(2).Line up the plastic tab on the deflection yoke assembly with the silver line on the face of pickup tube as shown below.

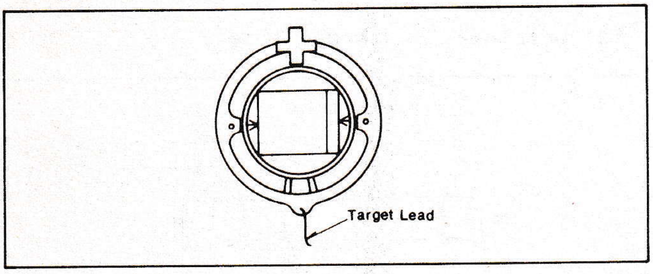


Fig. R6

(3).Push the pickup tube in the deflection yoke assembly.
(4).Reverse the previous steps.

3. ADJUSTMENT AFTER PICKUP TUBE REPLACEMENT

After replacement of the pickup tube, readjust the following controls.

(1).TARGET VOLATGE ADJUSTMENT (ITEM 4)
(2).BEAM CURRENT ADJUSTMENT (ITEM 5)
(3).FOCUS ADJUSTMENT (ITEM 6)
(4).ROTATION ADJUSTMENT (ITEM 7)
(5).BACK FOCUS ADJUSTMENT (ITEM 8)
(6).BEAM ALIGNMENT ADJUSTMENT (ITEM 9)
(7).VERTICAL SIZE/CENTERING (ITEM 10)
(8).HORIZONTAL SIZE/LINEARITY (ITEM 11)
(9).BIAS LIGHT ADJUSTMENT (ITEM 12)
(10).HORIZONTAL CENTERING ADJUSTMENT (ITEM 13)
(11).BIAS LIGHT SHADING ADJUSTMENT (ITEM 14)
(12).R/B SEPARATION ADJUSTMENT (ITEM 19)
(13).DYNAMIC FOCUS ADJUSTMENT (ITEM 20)
(14).COLOR SHADING ADJUSTMENT (ITEM 21)
(15).R/B GAMMA ADJUSTMENT (ITEM 24)

2-2 REPLACEMENT OF THE LENS UNIT

1. REPLACEMENT OF THE LENS UNIT

(1).Unscrew 2 screws (D) and then remove the front case unit.
(2).Disconnect the connectors, P5102, and P851.

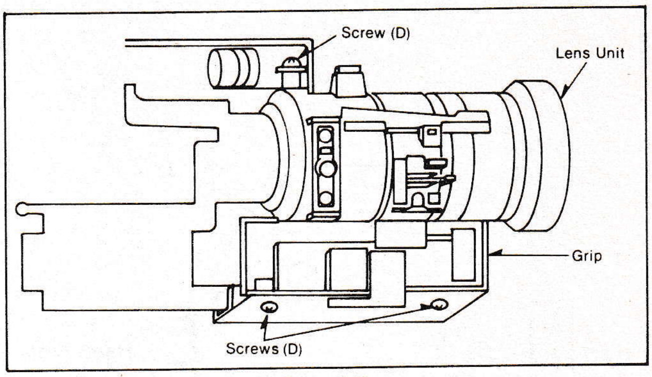


Fig. R7

(3).Unscrew 3 screws (E) and then remove the lens unit.

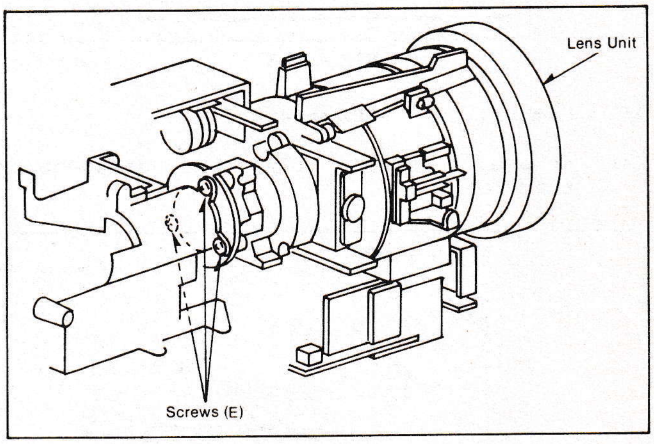


Fig. R8

(4).Install the new lens unit,using lens cleaning paper to keep the lens stopless.
(5).Reverse the previous steps.

2. REPLACEMENT OF IRIS MOTOR UNIT

(1).First remove the lens unit from chassis.
(2).Remive the 5 screws (F) and then remove the iris motor unit.

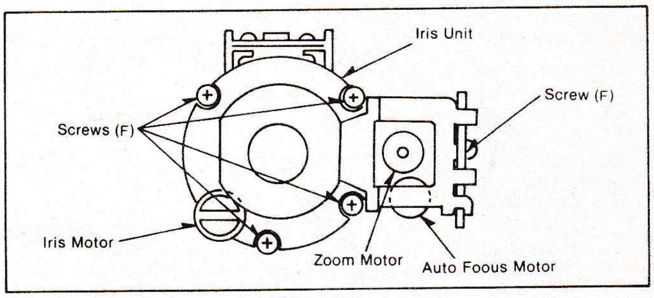


Fig. R9

(3).Install the new iris motor unit. Before assembly of the iris motor unit to the chassis,confirm that there are no dust on the iris motor unit.
(4).Reverse the previous steps.
(5).After replace the iris motor unit adjust the ALC/AGC adjustment.

3. REPLACEMENT OF AUTO FOCUS MOTOR AND P.C.B

(1).First remove the Lens unit from chassis.
(2).Disconnect the connectors P5103 and P5104.

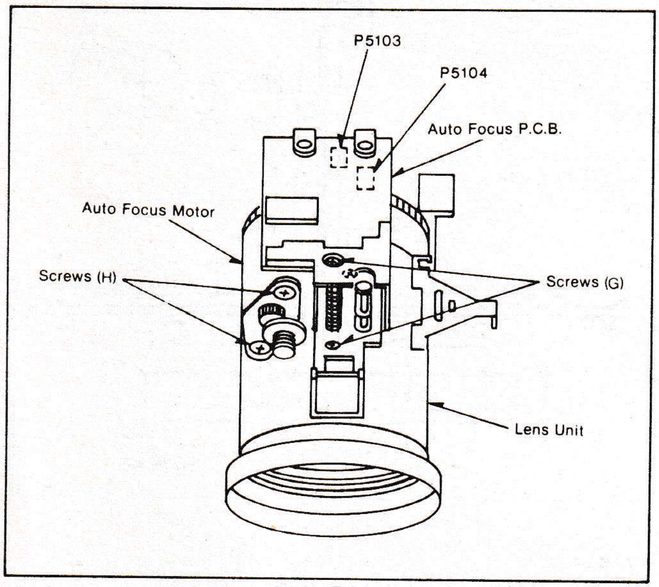


Fig. R10

(3).Unscrew 3 screws (G) and remove the Auto Focus P.C.B.
(4).Unscrew 2 screws (H) and remove the Auto Motor.
(5).Install the Auto Focus P.C.B or Auto Focus Motor.
(6).Before assembling the lens unit to the chassis, confirm that there are no dust on the lens surface.
(7).Reverse the previous steps.

4. REPLACEMENT OF ZOOM MOTOR

(1).First, remove the lens unit from the chassis.
(2).Unscrew 2 screws (I) and remove the Zoom Motor.

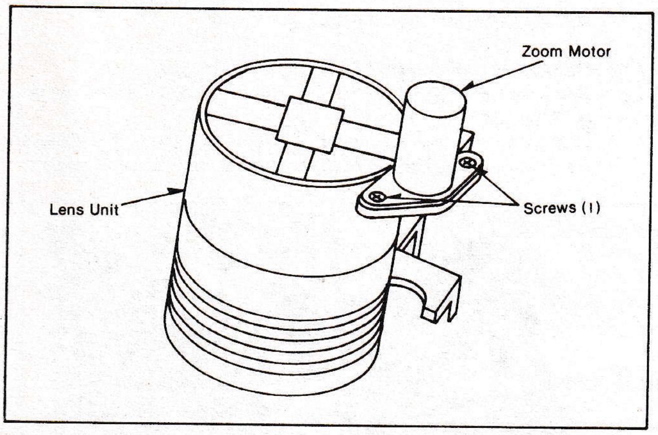


Fig. R11

(3).Install the new Zoom Motor.
(4).Before assembling the lens unit to the chassis, confirm that there are no dust on the lens surfase.
(5).Reverse the previous steps.

2-3 REPLACEMENT OF DD CYLINDER UNIT

Work with extreme care when removing or replacing the DD cylinder unit.
Do not touch video heads during servicing.

(1).Remove the Main C.B.A and Cylinder shield unit.
(2).Remove the screw (J) to take the Earth Holder unit.

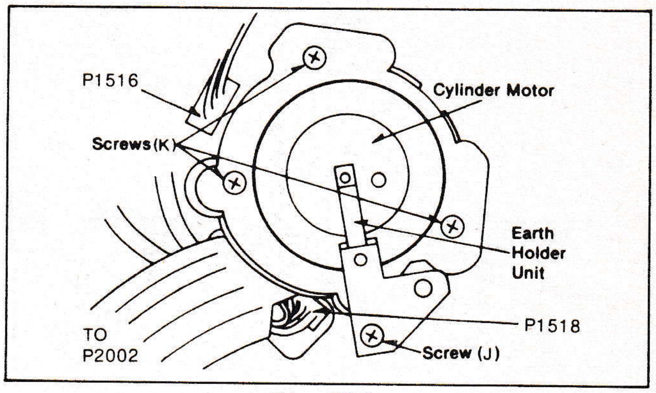


Fig. R12

(3).Disconnect 3 connectors (P1516. P2002 and P1518).
(4).Remove the 3 screws (K) to take DD cylinder unit out.

Note:

Since there is very little clearance between DD cylinder unit and chassis, remove the DD cylinder unit gently and carefully.

(5).Connect the connectors P1516 and P1518.
(6).Reinstall the new cylinder unit, tighten the 3 screws.
Then re-connect a connector P2002.

Note:
1. Gently rub the video head in direction of tape travel with Head Cleaning Stick.
2. After replacement, confirm performance. If any further maintenance is required, perform "TAPE INTER-CHANGEABILITY ADJUSTMENT".

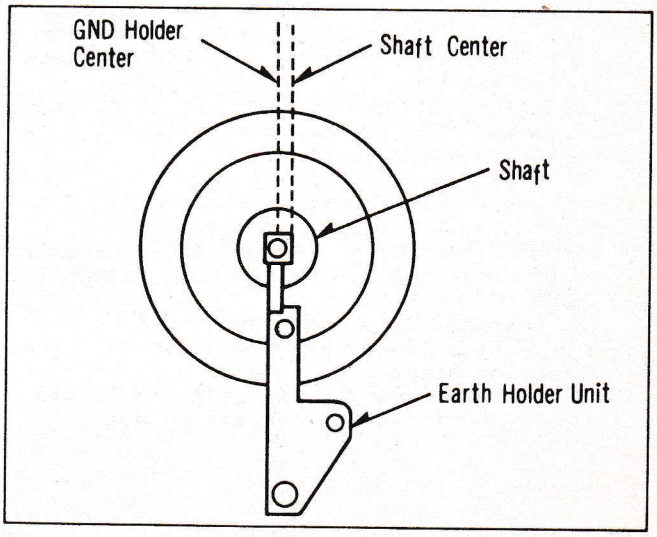


Fig R13

3. Do not touch Mounting Base with screws on the DD cylinder unit.

2-4 REPLACEMENT OF CAPSTAN STATOR UNIT

(1).Remove the 2 screws and take belt cover out.
After that remove the capstan belt.
(2).Pull out the capstan rotor.

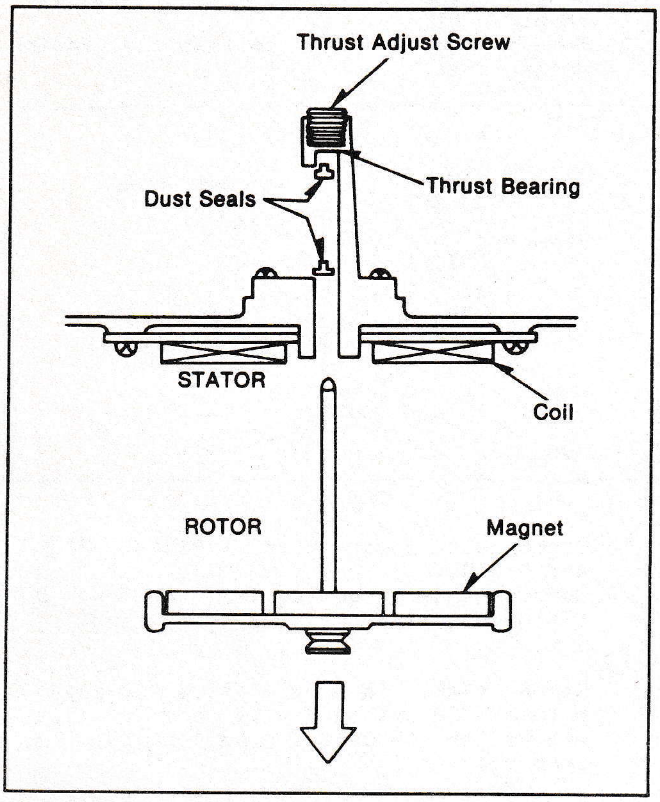


Fig. R14

Note:
In this time, pay attention not to lose 2 Dust Seals.

(3).Replace the new rotor insertion 2 Dust Seals with fully care as shown Fig. R14.

Note:
1. Before replacement of new rotor, loose the Thrust Adjust Screw completely.
2. Pay attention to the replacing new rotor not to adsorb toward the stator quickly. So, hold the rotor firmly, put some sheets of paper on the coil and replace it carefully.
3. In this replacement, do not touch the Capstan Shaft by any hard material like drivers or tweezers.

(4).Push on the clutch pully on bottom side of mechanical unit to confirm if the clutch pully rotates or not.
(5).Tighten the Thrust Adjust Screw slowly until the Clutch Pully just start t turn.
(6).Furthermore tighten the thrust Adjust Screw by a 240degrees - 270degrees turn from the start of turning.
(7).After replacement, wipe off the Capstan Shaft to remove oil, grease or dust.

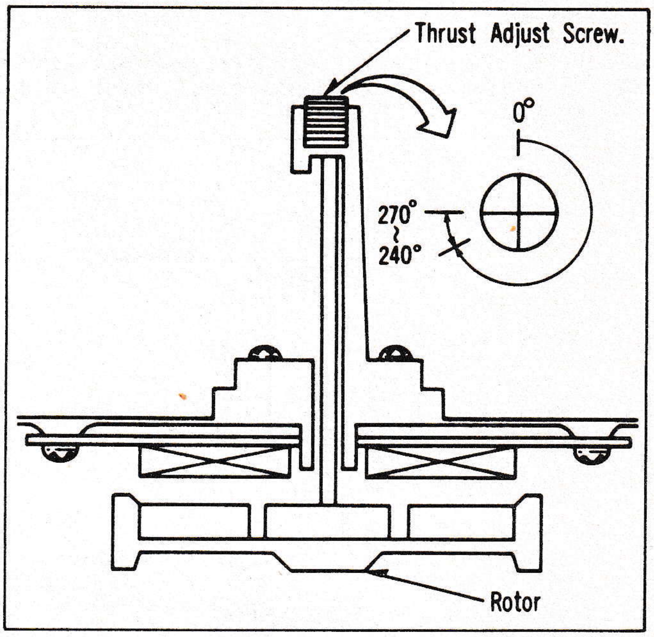


Fig. R15

Note:
If the Thrust Adjust Screw is fully opened, you have to pay attention not to lose Thrust Bearing.
When you fix it, confirm that the direction of Thrust Bearing is correct as shown below.

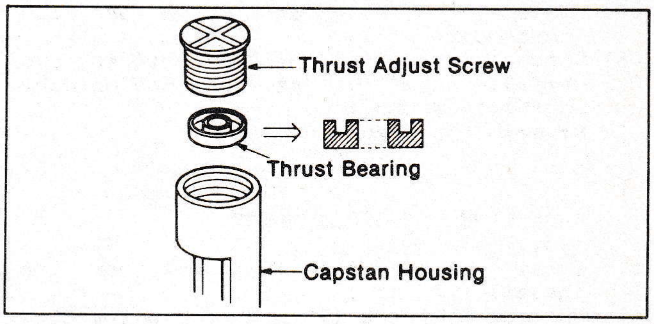


Fig. R16

4. REPLACEMENT OF TENSION BAND

(1).Remove the cassette compartment.
(2).Remove a retaining ring (A) and take out a Rew Arm (A) Unit.
(3).Remove a retaining ring (B) and a Snap washer and take out a Tension Band Unit.

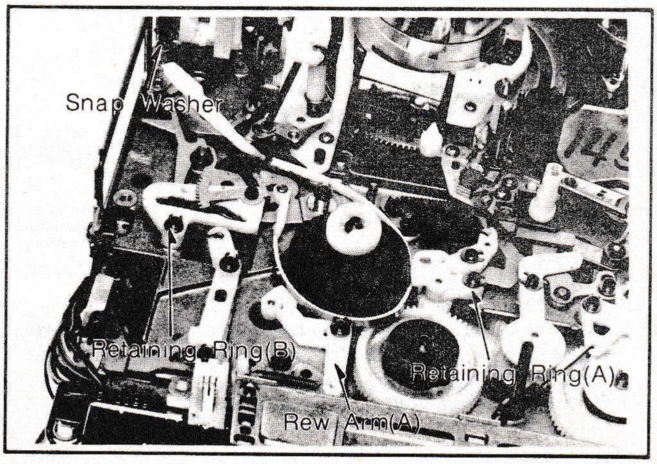


Fig.R17

(4). Remove a screw, and Tension Band from Band Release Arm and Tension Arm Unit.

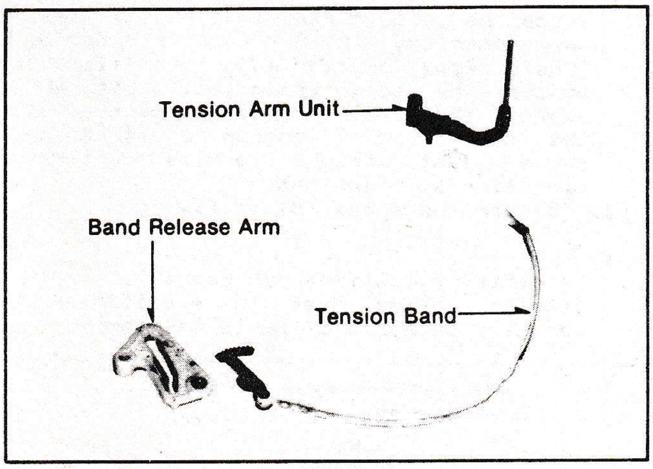


Fig. R18

(5).Replace a new Tension Band by proceduring reverse steps shown above.

MECHANICAL ADJUSTMENT PROCEDURES.

1. PROCEDURE FOR CLEANING OF UPPER CYLINDER UNIT.

(1).Position the video head to clean and hold the upper cylinder to keep it from turning while cleaning.
(2).Gently rub the video head in direction of tape travel with Head Cleaning Stick.
(3).Repeat for the other three video head.

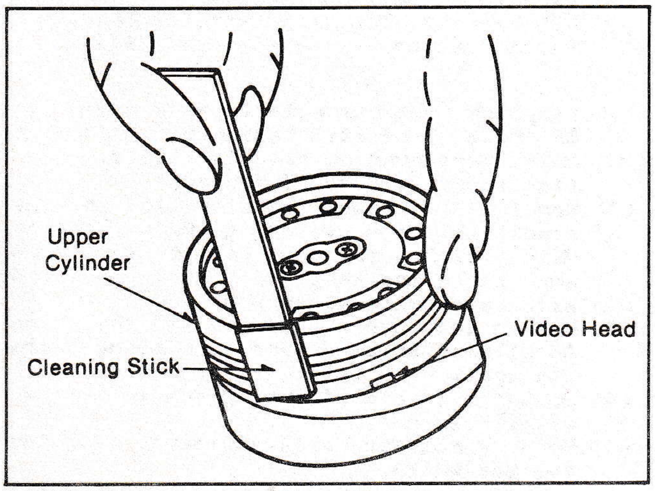


Fig. M1

Note:
(1) Do not rub vertically.
(2) Do not apply any pressures to heads. If contamination is not easily removed, continued gentle wiping will usually remove the substance.

2. CONFIRMATION OF BRAKE TORQUE

* Equipment Required:
Dial Torque Gauge
Adaptor for Gauge
* Specification:---------15~55g-cm(stop)

(1).Attach the adaptor to the torque gauge and place the deck in STOP mode.
(2).Place the torque gauge on the reel table. The weight of gauge should not rest on the reel table.

Note:
Confirm that the Drive Gear does not touch to the Clutch Gear.

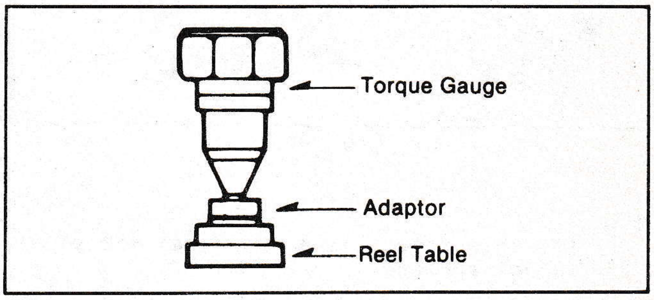
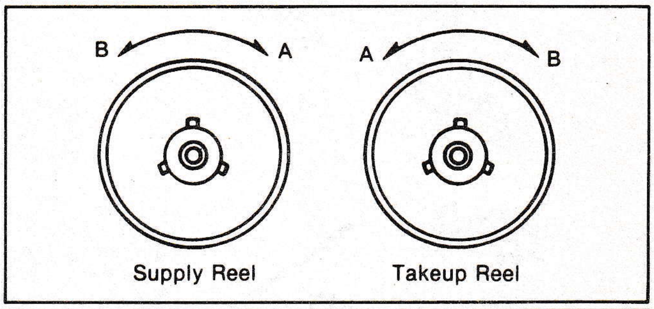


Fig. M2

(3).Turn torque gauge in either direction indicated in the Fig.M2, and read the gauge when the brake begins slipping.

Note:
If proper brake torque can not be obtained,check the both take-up and supply clutch gear.



	A	B
Takeup	15~55g-cm	15~55g-cm
Supply	15~55g-cm	15~55g-cm

Fig. M3

3. TENSION POST POSITION ADJUSTMENT

* Specification :----------1mm~1.7mm

(1). Remove the Cassette Up unit by 4 screws. (Refer to the disassembly procedures titled in Removal of the Cassette Compartment).
Place the unit in Play mode by rotating Drive Gear (A) in clockwise shown below.

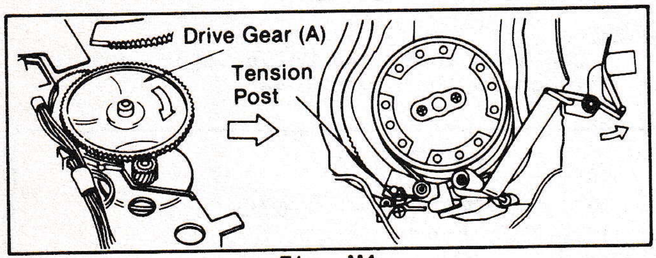


Fig. M4

Note:
In this case, make sure that the power is not applied.

(2).Loosen the screw (A) a little bit and adjust the Tension Post adjustment plate so that the "Distance (A)" shown below becomes just meet in the specification (1mm~1.7mm).
(3).Tighten the screw (A) to fix it.

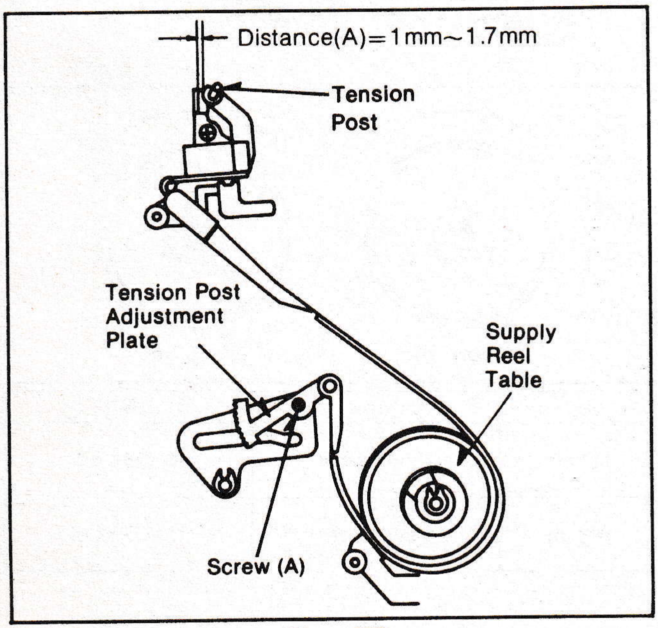


Fig. M5

Note:
After this adjustment, please confirm that under pin of the Tension Post does not touch the edge Full Erase Head Base.

4 BACK TENSION ADJUSTMENT

4-1 Simplified Back Tension Adjustment

(1).Place the unit in Play mode as the same way described in previous procedure, Tension Post Position Adjustment item 2.
(2).Loosen the screw (B) a little bit and adjust the Tension Adjust piece so that the second cog of Tension Adjust piece comes just stright to its vertical direction as shown below.
(3).Tighten the screw (B) to fix it.

Note:
By this simplified adjustment, back tension comes just in specification normally in spite of parts tolerance.

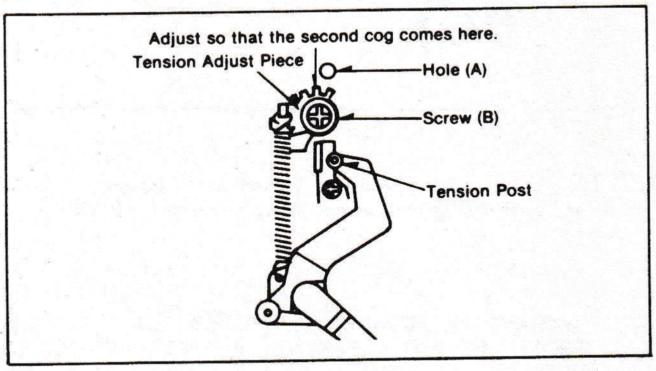


Fig.M6

4-2 Complete Back Tension Adjustment

For the strict and accurate back tension adjustment, however, following procedures should be done.

* Equipment Required:
Back Tension Meter (Tentelometer)
Fine Adjustment Screwdriver
VHS Cassette Tape (120 Minutes Tape)

* Specification:--------------22~27g

(1).Playback the cassette tape recorded in SP mode from its beginning and wait until tape running has stabilized. (for approx. 10 to 20 seconds)
(2).Confirm the back tension is in the specification by using Back Tension Meter with great care of not to touch any parts and keeping in good condition with tape while measuring.
(3).Loosen the screw (B) and fit the Fine Adjustment Screw driver by putting into its small Hole (A).
(4).Move the Tension Adjust piece in either of direction.
(5).Upon completion of adjustment, tighten the Screw (B).

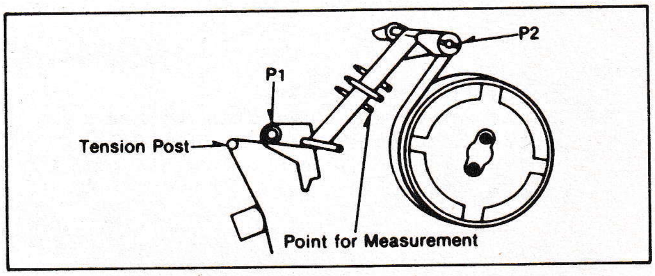


Fig.M7

5. POSITION ADJUSTMENT OF SAFETY TAB SWITCH

* Equipment Required
Cassette Holder Fixture (VFKS0017)

(1).Remove the cassette compartment from the mechanical chassis.

(2).Slightly loosen the screw (A) and place the cassette holder fixture on the chassis.

(3).Adjust the safety tab switch angle either forward or backward until the safety tab switch closes and just turns ON.

(4).Slightly remove the cassette holder fixture from the chassis and tighten screw (A).

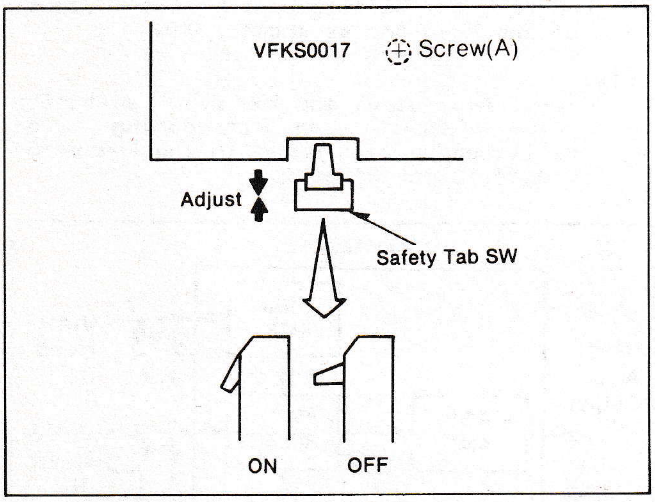


Fig. M8

6. REEL TABLES HEIGHT ADJUSTMENT

* Equipment Required:
Post Adjustment Plate
Reel Table Height Fixture

* Specification
Take-up Reel-----0~0.15mm
Supply Reel------0.05^0.25mm

Note:
Cut-out on Post Adjustment Plate is reference of reel table height and their height is measured based on this reference.

1. Place the post adjustment plate over the reels, and put the fixture on the plate Set the fixture to zero "0" with the foo scraper of the gauge touching the cut-out portion of the plate.

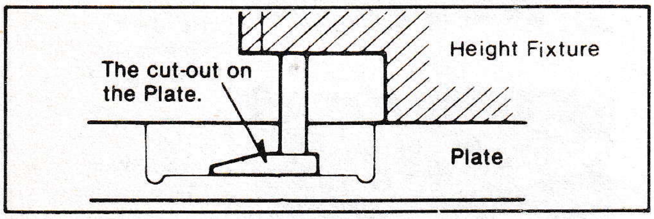


Fig. M9

2. Then measure the top portion of reel table and confirm the difference just performed in former step. Do the same for the other reel table.

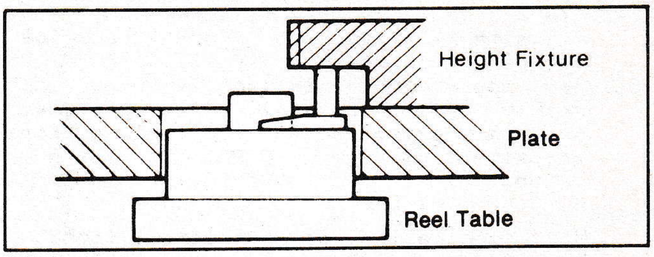


Fig M10

3. If a height difference in readings between the cut-out portion of plate and reel tables is not in the specification (higher or lower) adjust the height of the reel to obtain specified height.
4. For adjustment add or reduce a washer.

7 HEIGHT ADJUSTMENT OF TAPE GUIDE POSTS

* Equipment Required:
Hex Wrench (VFKS0048:0.71mm)
Post Adjustment Plate
Reel Table Height Fixture
Nut Driver
Post Adjustment Screwdriver

(1).Remove the cassette compartment from the mechanical chassis and the cylinder barrier.

(2).Put the Post Adjustment Plate on the chassis.

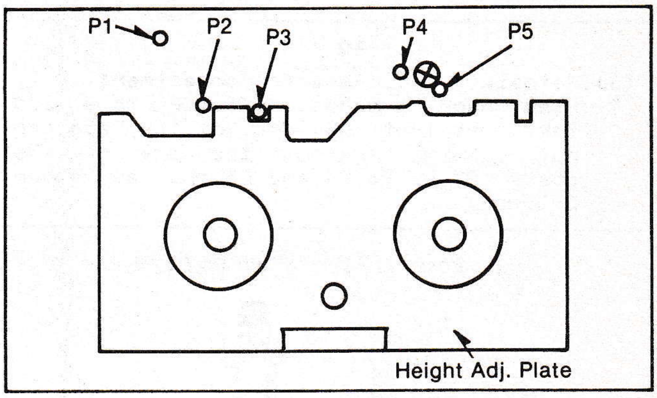


Fig M11

(3).Install the post adjustment plate and move all posts if required so that they are just in the position for stop mode. (Lower end of post, tape guide, should be lower than foot scraper of fixture). Loosen a hex screw located on the lower portion of posts (P2 & P3) then turn the top of the posts with post adjustment screwdriver.

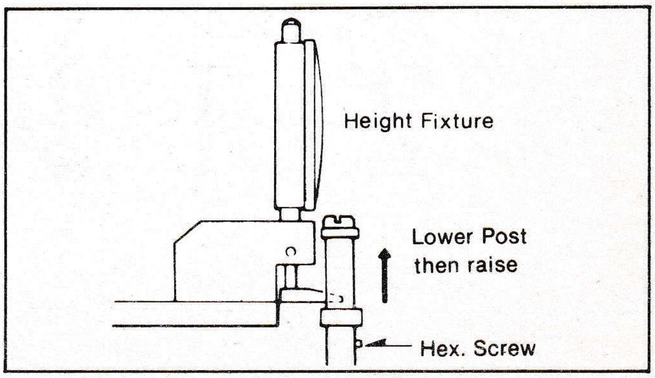


Fig M12

(4).Place the height fixture on the adjustment plate and place the foot scraper of gauge to the post.

(5).Set the height fixture to zero and slowly raise the post until it just touches the foot scraper of fixture. For adjustment of P1, P4 & P5, use the nut driver.

Note:

Upon completion of adjustment,tighten hex. Screws on P2 and P3 and install the post cap on P5. When the post cap on P5 is reinstalled, orient it as shown below viewing from the direction indicated by the arrow.

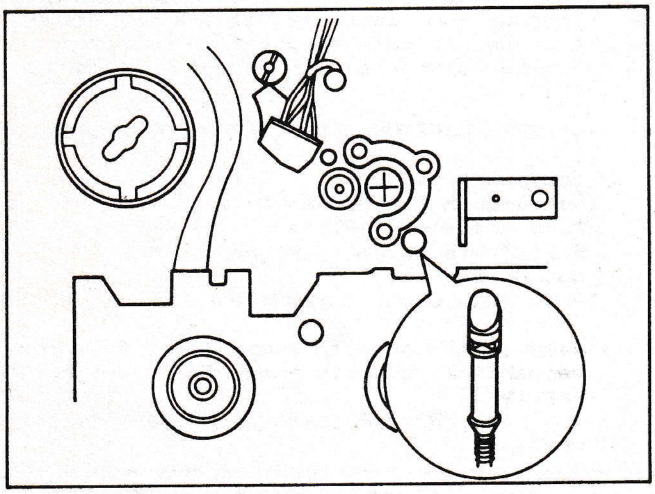


Fig M13

(6).Reinstall the cassette compartment.

(7).Play back a normal cassette tape and make sure that the edges of the tape are not curling against the edge of the posts P1,P2,P3,P4 and P5 post as shown below.

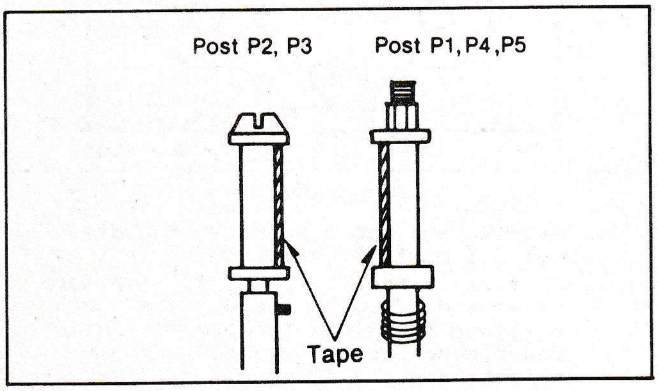


Fig M14

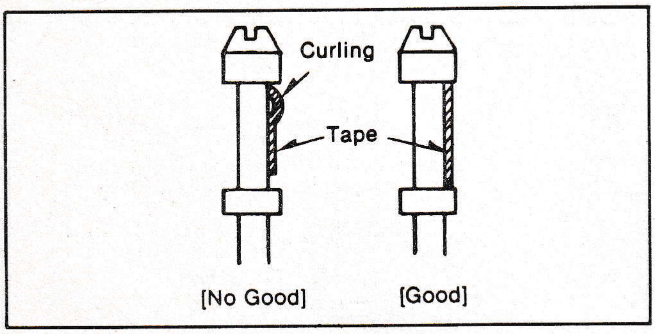


Fig M15

(8).If curling appears, readjust each post.

8. TAPE INTERCHANGEABILITY ADJUSTMENT

Note:

To perform these adjustment/confirmation procedures, make sure that the tracking control is set into the click (fixed) position.

* Equipment Required:
Alignment Tape (VFKS0001H6)
Post Adjustment Screwdriver
H-Position Adjustment Screwdriver
Hex. Wrench (VFKS0048:0.71mm)
Nut Driver

8-1 Confirmation/Adjustment of Envelope Output

(1).Connect the oscilloscope to the output of the Head Amp as shown below.

Note:

Head Amp output and the head switching pulse input for triggering the oscilloscope are shown in the Luminance Process Block Diagram.

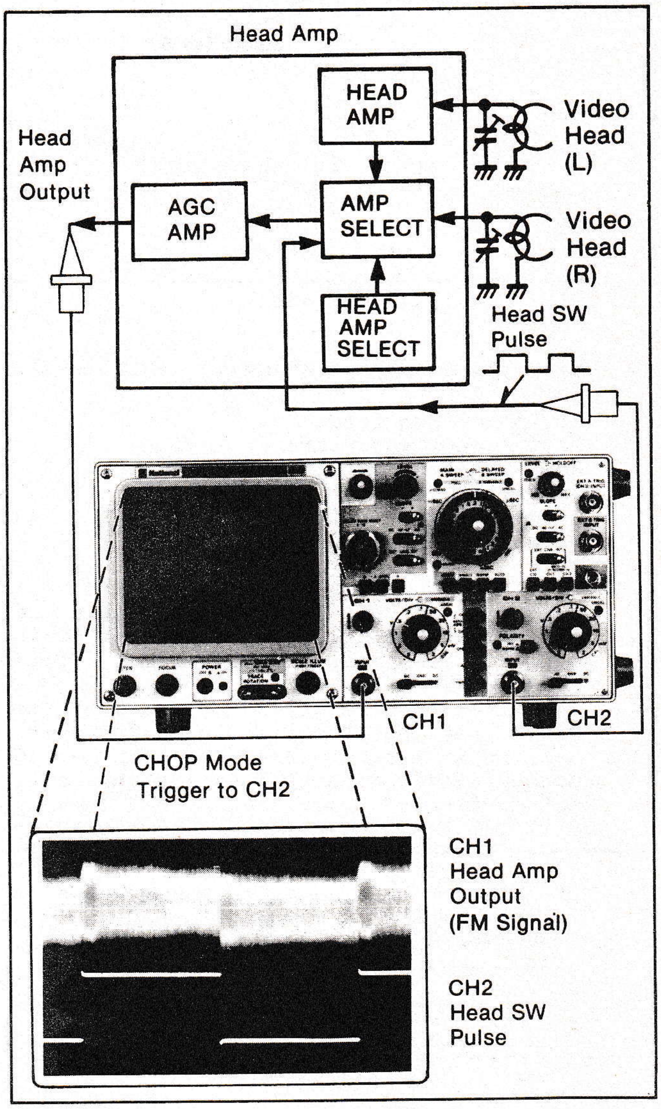


Fig.M16

(2).Playback the monoscope portion of the alignment tape and adjust posts P2 and P3 while watching the scope display so that RF envelope on the scope becomes as flat as possible.

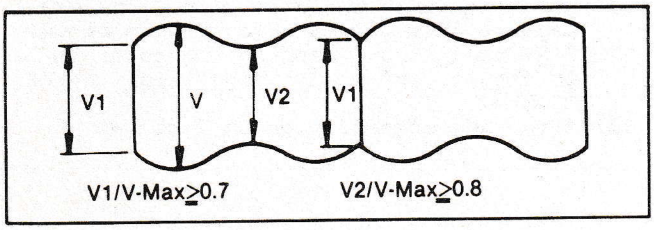


Fig.M17

(3).If scope display is as follows, adjust the height of P2 shown below.

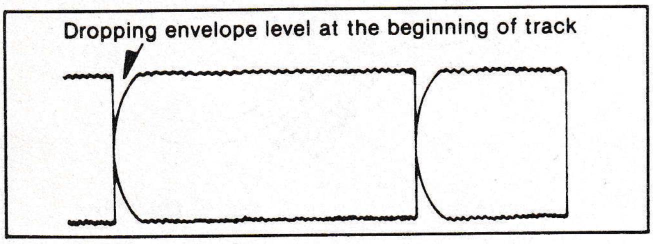


Fig.M18

(4).If the scope display is as follows, adjust the height of P3 shown below.

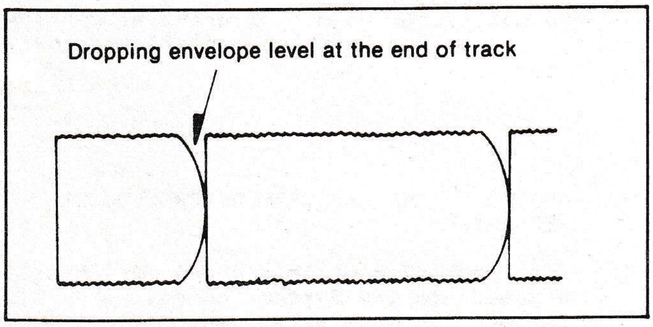


Fig.M19

(5).When P2 and P3 posts are adjusted correctlly the scope display becomes as shown below.

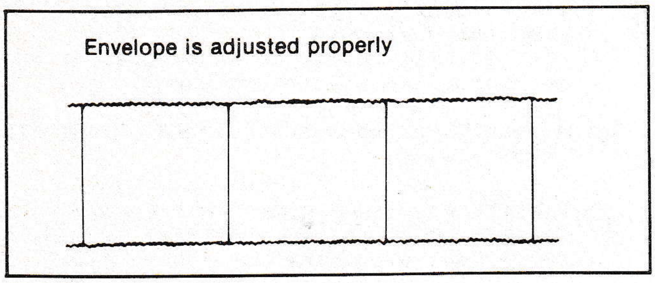


Fig.M20

(6).When adjustment is required, turn slowly and wait for servo lock. Be sure the tape travels over the post as shown.

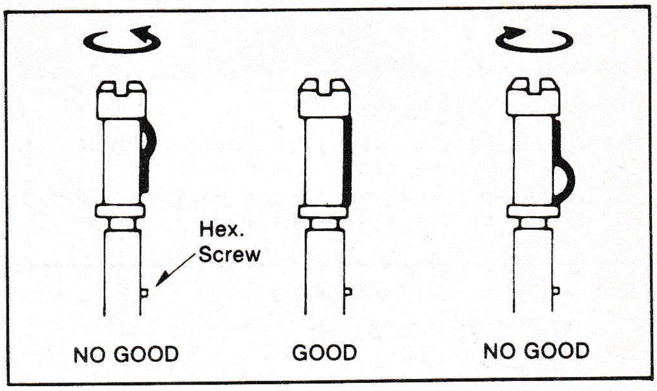


Fig.M21

8-2 Confirmation of A/C Head Height

Note:
Unless the A/CHead is replaced, this procedure should not be performed.

(1).Looking at the lower edge of the control head with the tape running, ensure that the lower edge of the tape runs along the lower edge of the control head. If it doesn't slightly turn the nut (A) in either direction to correct. Clockwise to lower the head and counterclockwise to raise it.

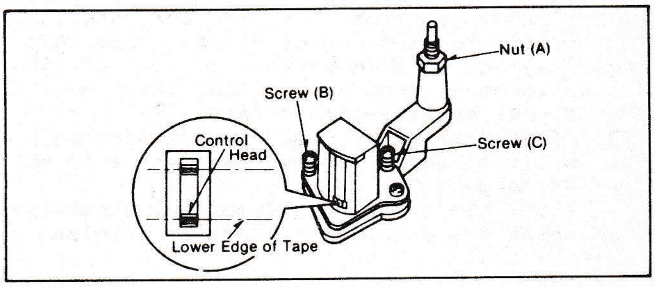


Fig.M22

8-3 Confirmation of Tilt of A/C Head

This procedure should be performed after the height adjustment of P4.

(1).Play back the tape and confirm the tape runs between lower and top limiters of post. And confirm the condition of tape running.

(2).If the adjustment is required, turn counterclockwise the screw (C) so that the curling is apparent with lower edge of P4. Then turn clockwise the screw (C) so that the curling is smooth out.

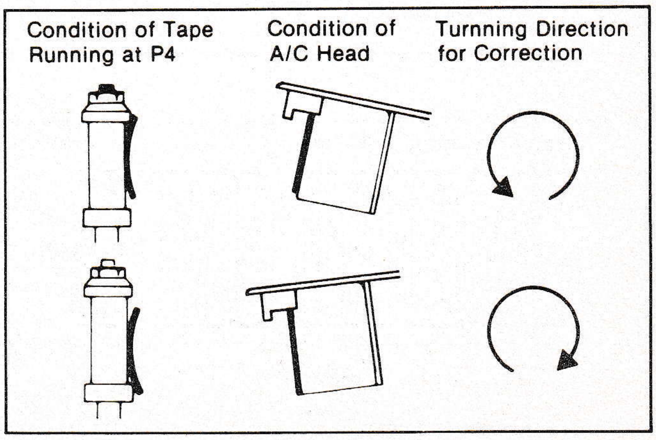

Condition of Tape Running at P4
Condition of A/C Head
Turnning Direction for Correction

Fig.M23

8-4 Adjustment of A/C Head Height and Azimuth

(1).Connect the oscilloscope to TP4001 in the Audio section.
(2).Playback the monoscope portion (6KHz, Mono) of the alignment tape.

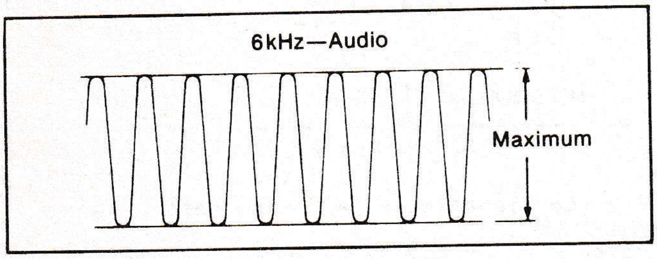


Fig.M24

(3).Adjust the screw (B) on the gead base so the output level becomes maximum.

8-5 Horizontal Position Adjustment of A/C Head

(1).Set the tracking control to the click (fixed) portion. Connect the oscilloscope to the output of the Head Amp.
(2).Playback the monoscope portion of the alignment tape and confirm that the RF signal envelope is correct.
(3).If adjustment is required, insert an H-position adjustment screwdriver into the Adjustment Nut.
(4).Slowly turn the Adjustment Nut clockwise until the envelope output is maximized.

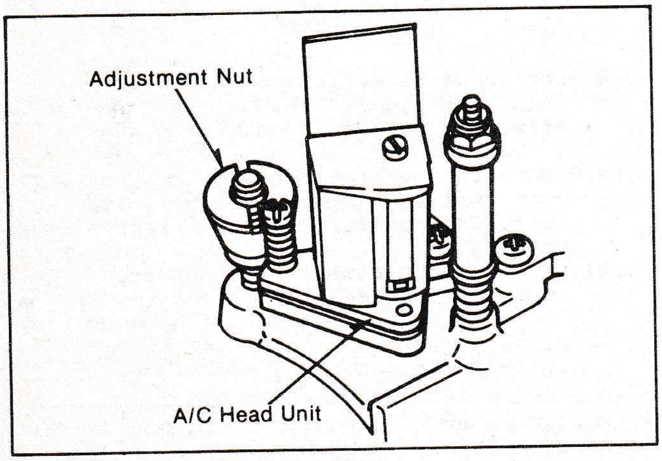


Fig.M25

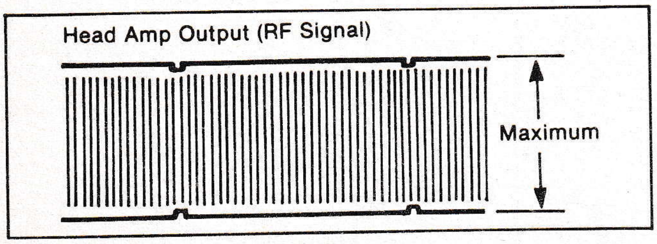


Fig.M26

9. ADJUSTMENT OF F.G.HEAD GAP

* Specification:-----------0.17~0.18mm

(1).Slightly loosen the 2 screws.
(2).Put the paper which is used for cover page of this volume into the gap between F.G.Head and Capstan rotor. (The thickness of this page is approx 0.09mm).
(3).After adjustment, tighten 2 screws.

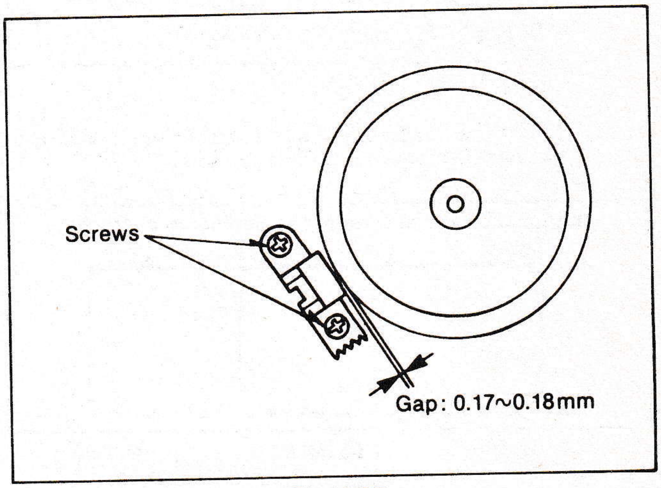


Fig.M27

Note:

Do not touch the circumferential surface of rotor and keep any magnetic material away.

10. ASSEMBLY AND ADJUSTMENT PROCEDURES OF MECHANISM.

The mechanism of this model is mostly engaged to the System Control Circuit, through the mode select switch.
Therefore the relation between the mode select switch and the cam gear decides all further mechanical movement of the mechanical parts such as levers, gears, rollers and so on.
If these parts are fixed in properly, the deck will be unloaded or compulsory stopped.
And it will result being damaged at any mechanical or electrical parts.

10-1 Assembly Procedures of Loading Rings and Loading Gears

(1).Install a Loading Ring T (1) unit and a Loading Gear (B) so that both triangle marks meat each other as shown below.

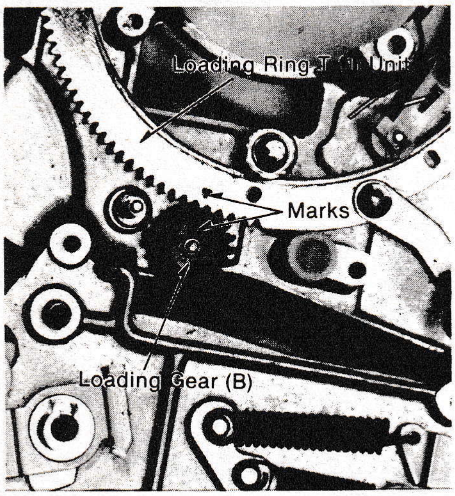


Fig.M28

(2).Install a Loading Gear (A) and next fix a Loading Ring S (1) Unit so that the holes of Loading Ring S(1) Unit and T(1) Unit meat each other as shown below.

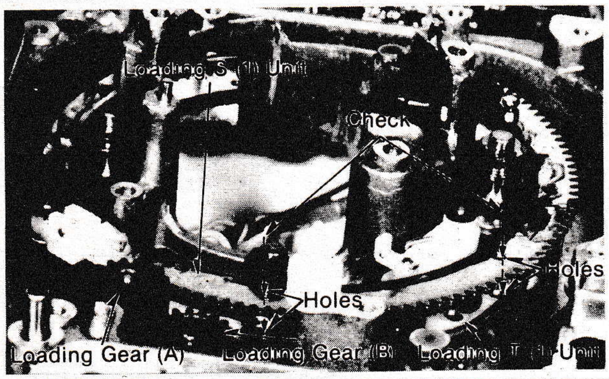


Fig.M29

Note:
Pay attention that the washers are remaining under the loading gears or any other parts.

10-2 Assembly Procedures of Take-up Loading Guide and Take-up Loading Posts Unit

(1).Install Loading Guide T Unit and Take-up Post Stopper.
In that time, the small projection of a Loading Link T Unit must be inserted into a gap of Loading Guide T Unit.

(2).Fix a Take-up side Loading Post Unit holding the small projection of the Loading Link T Unit and install a T Shaft Holder Unit.

10-3 Assembly Procedures of Supply Loading Guides and Supply Loading Post Unit

(1).Install 2 Supply Loading Guides that are screwing 4 screws.

(2).Slide a Supply Loading Post Unit into a gap between the Loading Guide S1 and S2 hockking a Connection Rod to a Connection Tie Unit as shown below.

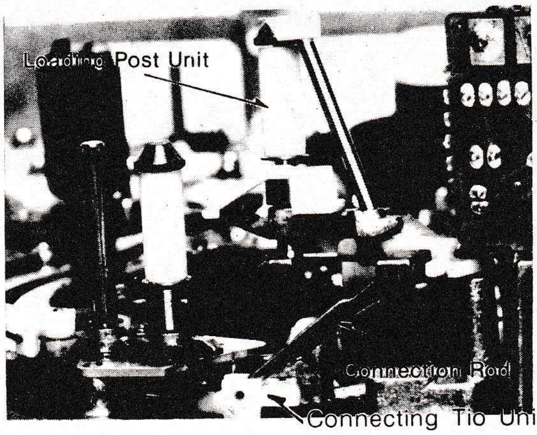


Fig.M30

(3).Set the Supply Loading Post Unit into Stop position as shown below.

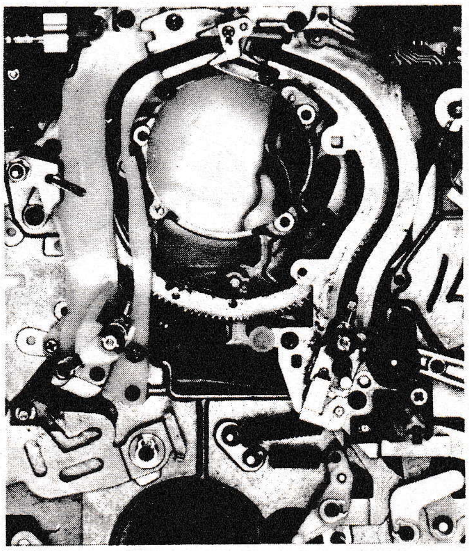


Fig.M31

(4).Install a V Stopper Base and a Supply Post Stopper.

10-4 Assembly Procedures of Main Rod.

(1).Place a Main Rod inserting 3 Thrust Washers and then insert 3 washers. After that, fix them using 2 retaining rings as shown below.

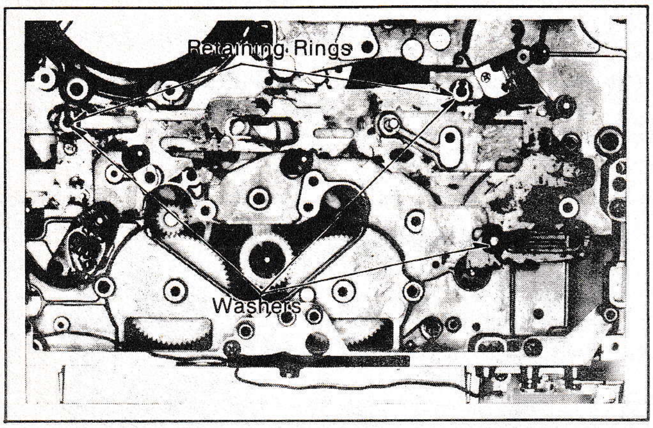


Fig.M32

(2).Install a Drive Arm Kick Lever hookking a Drive Arm kick Lever Spring and fix it using ring.

10-5 Assembly Procedures of Cam Gear and Sector Gear

(1).Make sure that the hole on a Main Rod just meat the hole on chassis as shown below and install a Cam Gear should coineide with the hole between a Cam Gear and the chassis Then install a retaining ring.

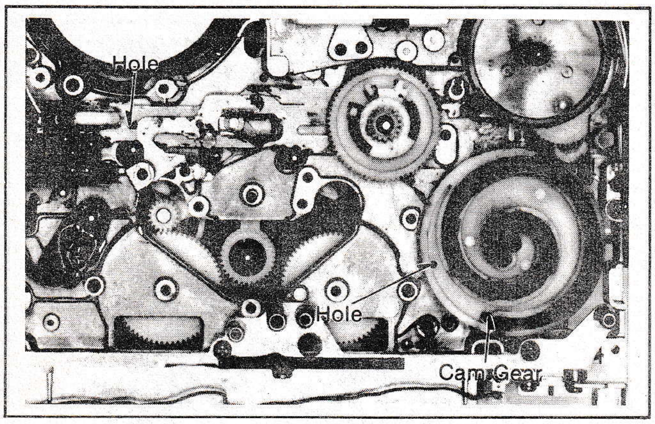


Fig.M33

(2).Install a Loading Gear (C) keeping the relation as shown below.

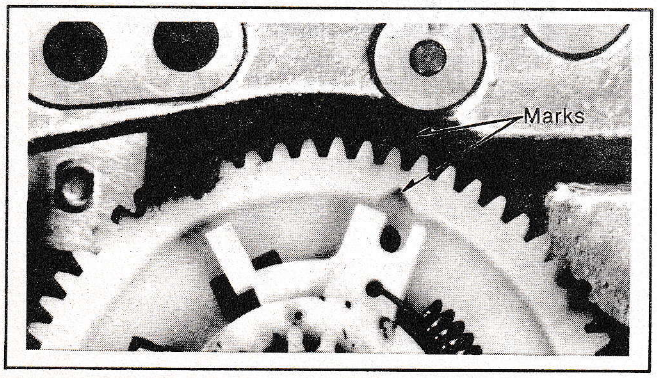


Fig.M34

(3).Install a Sector Gear as shown below.

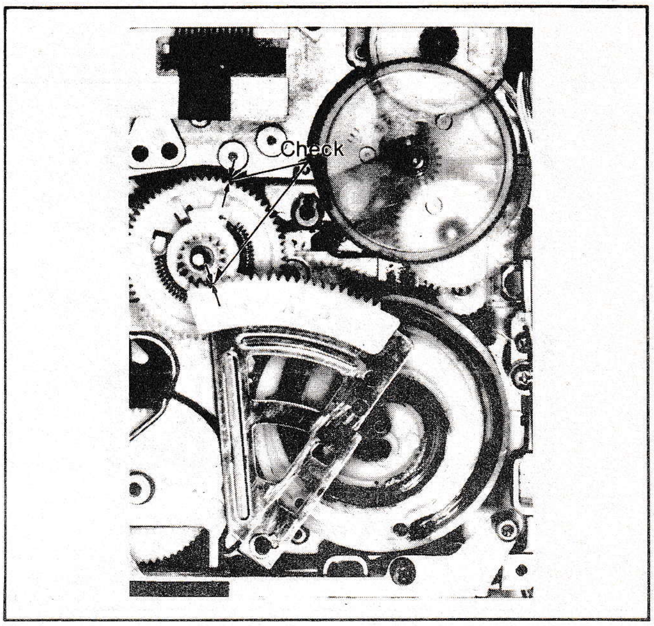


Fig.M35

(4).Fix a SG Limitter by 2 retaining rings.

10-6 Assembly Procedures of Mode Select Switch

(1).Perform this procedures after making sure that the mechanism position have already fixed.
First of all, confirm that the hole on a Main Rod is meating with a hole on a chassis.

(2).Move the moving contact of a Mode Select Switch into Stop position as shown below.

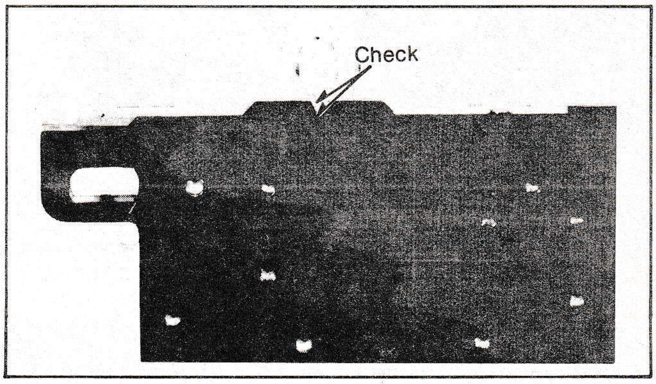


Fig.M36

(3).Install the Mode Select Switch keeping these relation writen in item (1) and (2) by screwing 2 screw.

Servicing Fixtures & Tools

VFMS0001H6 **VHS Alignment Tape**

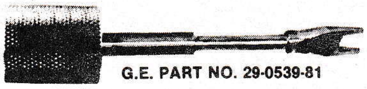
G.E. PART NO. 29-0542-79

① **VFK0137** **Post Adj. Screwdriver**
② **VFKS0003** **H-Position Adj. Fixture**

①

G.E. PART NO. 29-0531-81

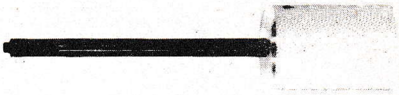
②



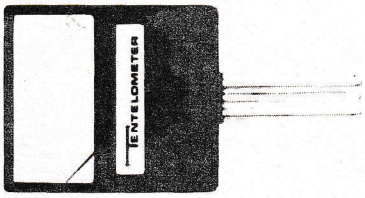
G.E. PART NO. 29-0539-81

VFK0157 **Fine Adjustment Screwdriver**

G.E. PART NO. 29-0529-81

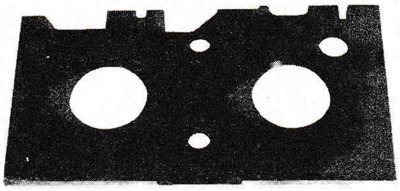


Back Tension Meter
(Tentelometer, Made in U.S.A.)



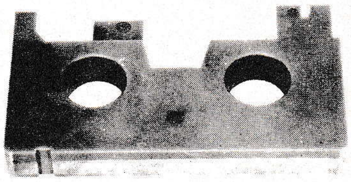
VFKS0010 **Post Adjustment Plate**

G.E. PART NO. 29-0532-81



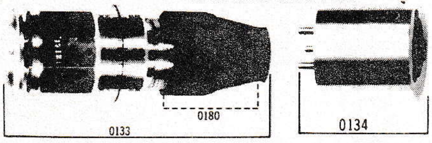
VFKS0017 **Cassette Holder Fixture**

G.E. PART NO. 29-0602-82



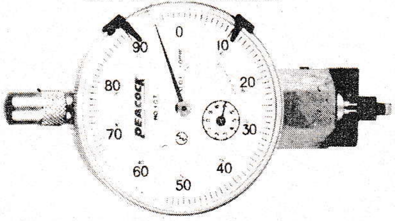
VFK0133 **Dial Torque Gauge**
VFK0180 **(Plastic Clamper Only)**
VFK0134 **Adaptor for VFKS0133**

G.E. PART NOS. 29-0547-79 GAUGE
29-0546-79 ADAPTOR

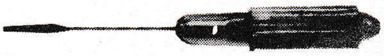


VFKS0009 **Reel Table Height Fixture**

G.E. PART NO. 29-0533-81

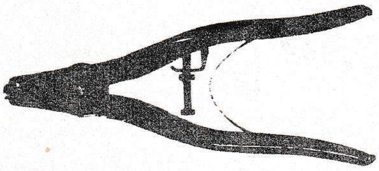


VFKS0031 **V-Hold Adj. Tool**

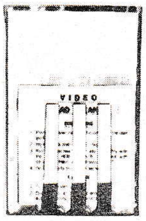


VFK0144 **Retaining Ring Remover (3mmφ)**

G.E. PART NO. 29-0535-81



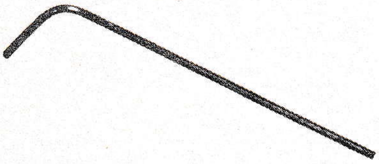
VFK27 **Head Cleaning Stick**



MOR265 **Morlytone Grease**

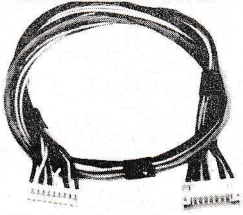
VFKS0048 **Hex. Wrench (0.71 mm)**

G.E. PART NO. 29-1706-85



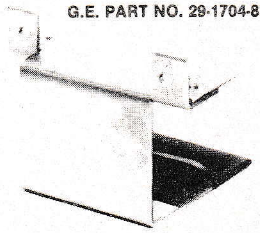
Extension Cable **VFKW0028**

G.E. PART NO. 29-1707-85



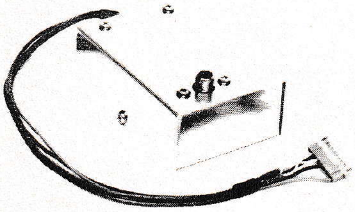
Camera Unit Holder **VFKW0030**

G.E. PART NO. 29-1704-85



Lumi/Chroma Separator **VFKS0047**

G.E. PART NO. 29-1705-85



4 ELECTRIC ADJUSTMENT PROCEDURES

4-1 ELECTRIC ADJUSTMENT FOR CAMERA SECTION

TEST EQUIPMENT AND TOOL

The following equipment is required for adjustment of the CAMERA section of VHS Movie

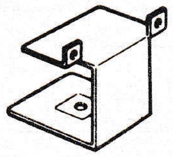
1. Oscilloscope
   Dual Trace, 25MHz, 2mV/DIV,
   10:1 Prove
   1:1 Prove
2. Digital Voltmeter or VTVM
3. Frequency Counter
4. Vector Scope
5. Light Meter
6. Tripod
7. Color Video Monitor
8. Lighting
   140 footcandles (1400lux),3200 degrees K
9. Reflection Chart

	GE PART NO.
Reflection Chart Set (Part No.: VFKS003)	**29-1707-84**
Gray Scale Chart (Part No.: VFKS003A)	**29-1708-84**
Color Chart (Part No.: VFKS003B)	**29-1709-84**
Registration Chart (Part No.: VFKS003C)	**29-1710-84**
Resolution Chart (Part No.: VFKS003D)	**29-1711-84**
Color Sheet (Part No.: VFKS003E)	**29-1712-84**

10. Light Box w 1 Chart

Light Box w 1 Chart Set (Part No.: VFKS002)	**29-1701-84**
Gray Scale Chart (Part No.: VFKS002A)	**29-1702-84**
Color Chart (Part No.: VFKS002B)	**29-1703-84**
Registration Chart (Part No.: VFKS002C)	**29-1704-84**
Resolution Chart (Part No.: VFKS002D)	**29-1705-84**
Light Box (Part No.: VFKS002Y)	**29-1706-84**

11. Camera Unit Holder
    (Part No.: VFKW0030) **29-1704-85**
    This is used to fix the camera unit on a tripod.



CAMERA UNIT HOLDER **29-1704-85**

Fig.E1

12. Extension Cable (Video - Camera)
    (Part No.:VFKW0028)
    This is used to operate by separating a camera unit a video recorder unit part.

EXTENSION CABLE
(VIDEO-CAMERA) **29-1707-85**

Fig.E2

13. Prastic Tip Driver

PREPARATIONS

1. Remove the camera unit from VTR chassis
   (Refer to the DISASSEMBLY SECTION)
   Unscrew 2 screws(A).
   Attach the camera unit to the camera unit holder (VFKW0030), and tighten the 2 screws.
2. Set the camera unit on the tripod using the camera unit holder.

   Set the camera unit holder on the tripod and tighten the screw.
3. Connect the video recorder unit and camera unit through the extension cable (VFKW0028).

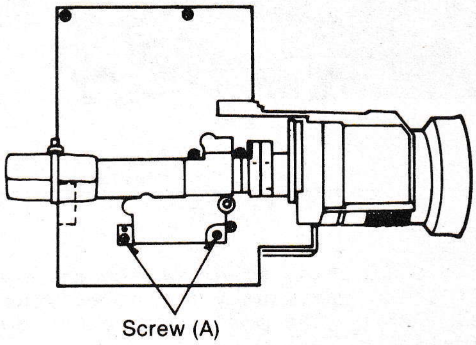


Fig.E3

Now power voltage is supplied to the camera unit from the video recorder unit, and the video signal from the color camera is fed to the video recorder unit. Thus you can see the picture from camera by observing the video recorder unit output.

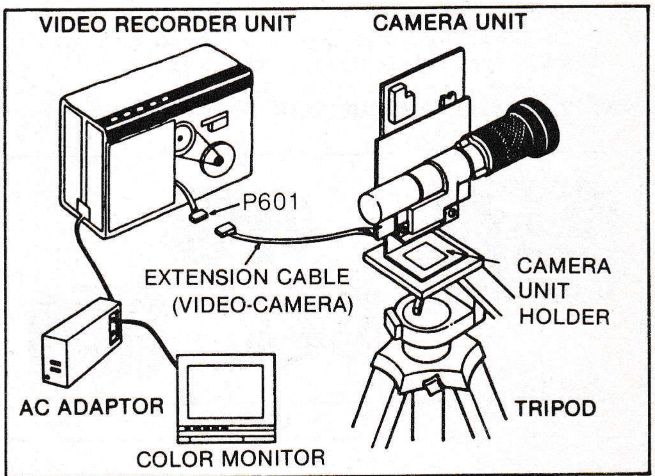


Fig.E4

NOTE:
1. Service work for the camera unit must be performed in a dust free location to maintain clean lens elements.
2. To achieve the best adjustment results, warm up the camera for approximately 30 minutes before adjusting.
3. In the deflection circuit, the high voltage such as 1400V is used.
   Do not touch these high voltage area shown below.

3. In the deflection circuit, the high voltage such as 1400V is used.
Do not touch these high voltage area shown below.

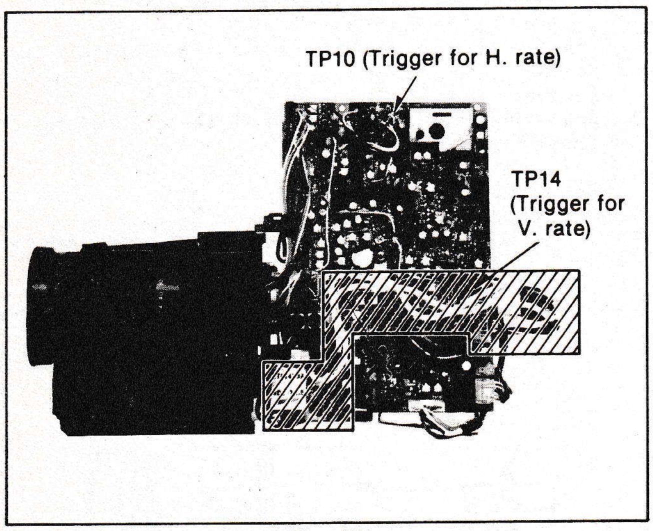


Fig.E5

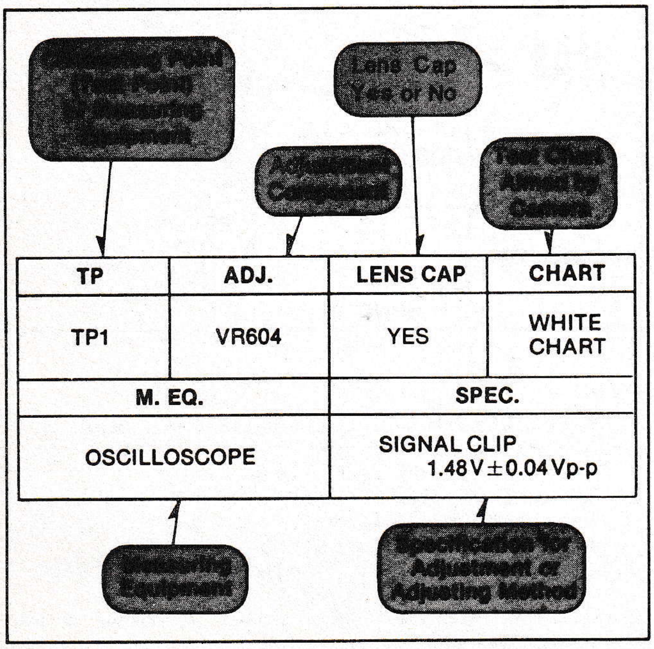
4. Every 5 minutes, power switch of the VTR unit is automatically off, thus power on again when the power goes down during adjusting.
To prevent auto off operation, connect a short jumper between TP6012 on the system control section and GND.

POSITION OF CONTROLS AND SWITCHES ON THE CAMERA

White Balance Switch ---- FIXED Position
Color Control Knob----- Center position

CAUTION:
Do not set the white balance Switch to AUTO position during the adjustment.

HOW TO READ THE ADJUSTMENT PROCEDURES


Connecting Point (Test Point) of Measuring Equipment
Lens Cap Yes or No
Adjustment Component
Test Chart Aimed by Camera
Measuring Equipment
Specification for Adjustment or Adjusting Method

TP	ADJ.	LENS CAP	CHART
TP1	VR604	YES	WHITE CHART
M. EQ.		SPEC.	
OSCILLOSCOPE		SIGNAL CLIP 1.48V±0.04Vp-p	

Fig.E6

FOR TRIGGER

To trigger the scope, the following test points are useful.

H: rate
TP10 (CP1 Signal)

V: rate
TP14 (VP Signal)

1. 8.6V ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP15	VR601		
M. EQ.		SPEC.	
D.V.M.		8.6V±50mV	

* This adjustment should always be performed before any other items because this voltage will affect overall camera circuit.

2. 3.58MHz ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP8	C442		
M. EQ.		SPEC.	
FREQUENCY COUNTER		3.579545MHz±40Hz	

3. HIGH VOLTAGE ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
G6 TERMINAL	VR609		
M. EQ.		SPEC.	
HIGH-VOLTAGE VOLTMETER		1400V±30V	

The high voltage voltmeter is necessary to measure the potential of G6 terminal of pickup tube.

(HIGH VOLTAGE VOLTMETER)
Range: More than 2000V
Impedance: 1000 M ohms

Do not re-adjust this adjustment (VR609) without above equipment, whenever the pickup tube is replaced.

4. TARGET VOLTAGE ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP12	VR611		
M. EQ.		**SPEC.**	
D.V.M.		Esj. +2V±0.5V	

(1).Connct the digital voltmeter to TP12.
(2).Adjust the target voltage control (VR611) so that the voltage is equal to the Esj value stamped on the Newvicon tube neck plus 2V+-0.5V.

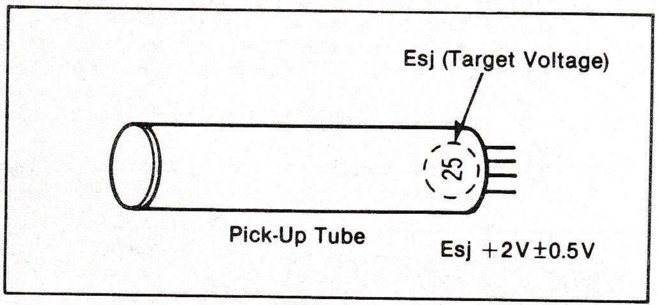


Fig.E7

5. BEAM CURRENT ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP1	VR604	NO	WHITE CHART
M. EQ.		**SPEC.**	
OSCILLOSCOPE		SIGNAL CLIP 1.40V±0.04Vp-p	

(1).Connect the scope to TP1 (H rate).
(2).Aim the camera at the scene which contains a high intensity object or the left edge of a light box, and zoom at the TELE side.
(3).Adjust the beam control (VR604) so that the signal clipping occurs 1.40 + - 0.04Vp-p.

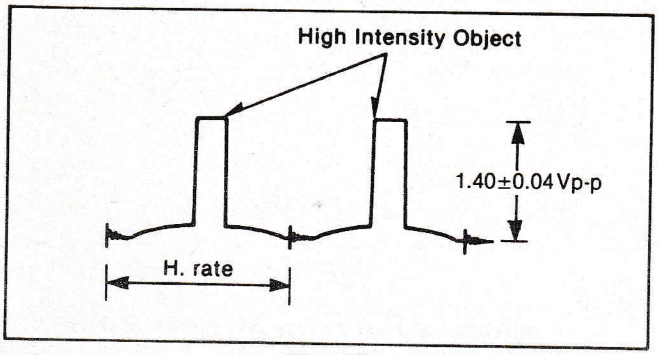


Fig.E8

(4).If the signal is less than 1.40Vp-p, use a more intense light source.

NOTE:
Be careful not to damage the pickup tube with too strong a light.

6. FOCUS ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP4	VR610	NO	WHITE CHART
M. EQ.		**SPEC.**	
OSCILLOSCOPE		SIGNAL LEVEL IS MAXIMIZED.	

(1).Aim the camera at the white chart.
(2).Connect the scope to TP4 (H. rate).
(3).Adjust the focus control (VR610) so that the carrier (3.9MHz) on the center portion of the pre-video signal becomes maximum.
(4).Make sure that the minimum green color on the center portion of monitor screen.

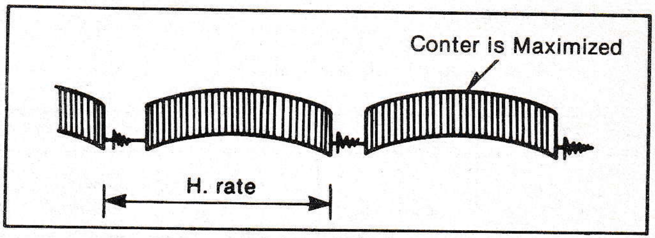


Fig.E9

7. ROTATION ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP1	TUBE	NO	WHITE CHART
M. EQ.		**SPEC.**	
OSCILLOSCOPE		MINIMUM BEAT	

(1).Remove the shield cover for pickup tube.
(2).Loosen the pickup tube holding screw.
(3).Aim the camera at the white chart.
(4).Connect the scope to TP 1 (V. rate)
(5).Adjust the focus control (VR610) for maximum signal level.
(6).Delay the sweep of the center portion of the vertical signal waveform and observe a few horizontal lines.
(7).Rotate the pickup tube by means of the tube socket (CAUTION 1.4KV) so that the beat during the horizontal period is minimum.

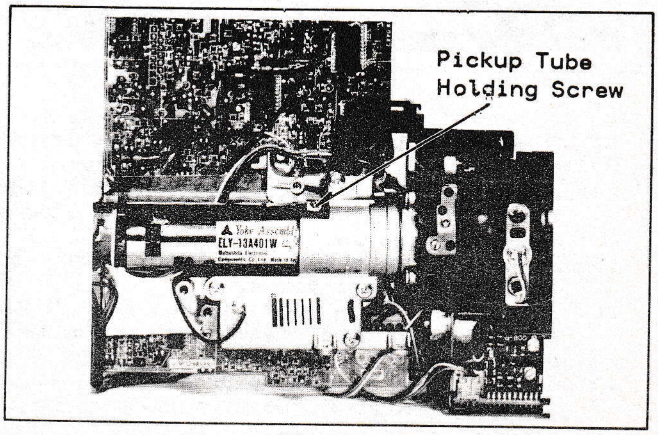


Fig. E10

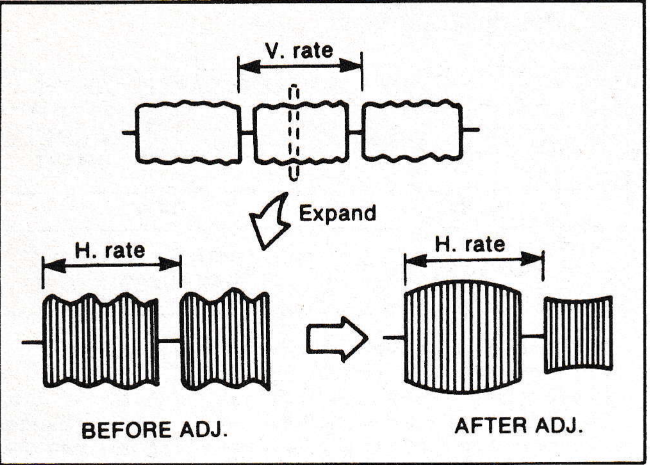


Fig.E11

(8).Carefully tighten the pickup tube holding screw.

8. BACK FOCUS ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
	LENS FOCUS	NO	DARK OBJECT
M. EQ.		SPEC.	
TV MONITOR		FOCUS TRACKS THROUGHOUT THE ZOOM RANGE.	

(1).Aim the camera at the dark object further than 6 feet (2m) from the camera.
(2).Loosen the hex screw using a 1.5mm hex wrench

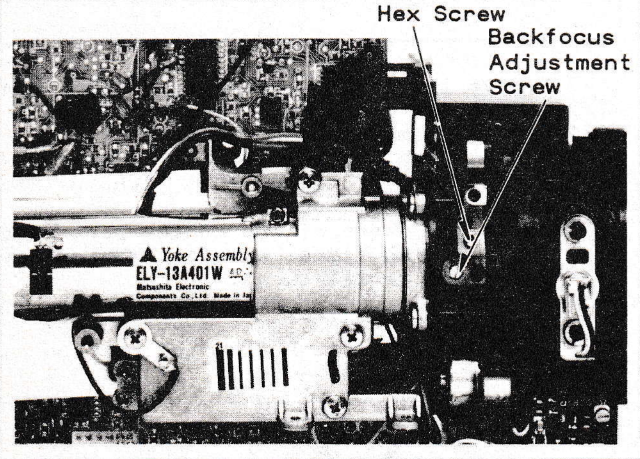


Fig.E12

(3).Zoom in (Close up/telephoto) and adjust the focus by turning the lens focus.
(4).Zoom out (Wide angle) and adjust the focus by turning the backfocus adjustment screw.
(5).Zoom in again and adjust the focus by turning the lens focus.
(6).Zoom out again and adjust the focus by turning the backfocus adjustment screw.
(7).Repeat this procedure until the focus tracks throughout the zoom range.

9. BEAM ALIGNMENT ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
	ALIGNMENT MAGNETS	NO	WHITE CHART
M. EQ.		SPEC.	
TV MONITOR		MAXIMUM RED	

(1).Aim the camera at the white chart.
(2).Set the focus control (VR610) so that the red or magenta color appears on the monitor screen.
(3).Remove the paint lock from the alignment magnets.
(4).Then while watching the color monitor, rotate the alignment magnets for minimum green tint in the center and maximum magenta (red) throughout the picture area.
(5).Lock the alignment magnets using the paint lock.
(6).Adjust the focus control (VR610) after this adjustment.

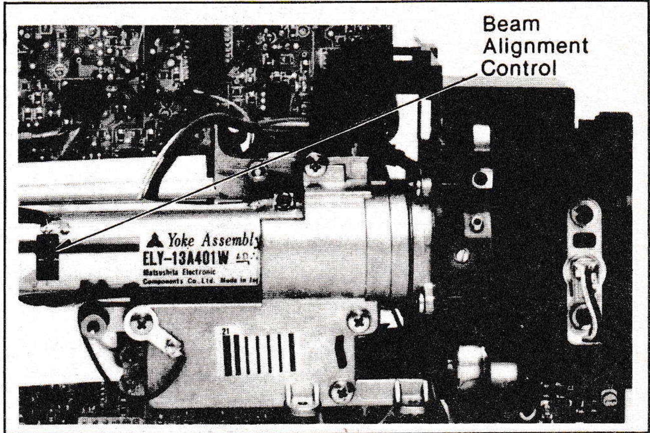


Fig.E13

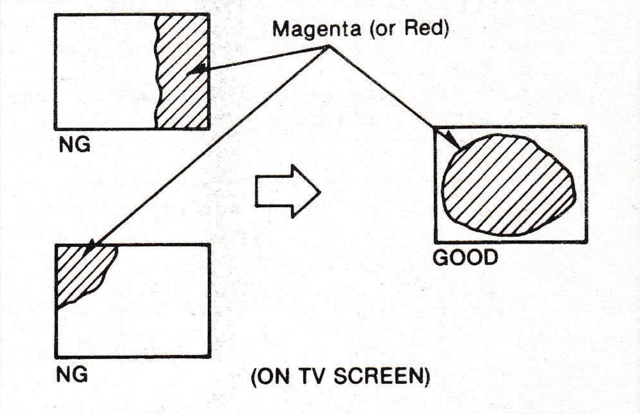


Fig.E14

Note:

Complete elimination of green corners or edge might not be achieved at this point,because dynamic focus and shading compensation remain to be set. It might be necessary to trim up the beam alignment adjustment after the dynamic focus and color shading adjustments have been completed.

10. VERTICAL SIZE/CENTERING ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP1	VR603	NO	WHITE CHART
	VR602		SMALL OBJECT

M. EQ.	SPEC.
OSCILLOSCOPE	ONE BEAT PER ENVELOPE
TV MONITOR	OBJECT DOES NOT MOVE VERTICALLY

(1).Aim the camera at the white chart.
(2).Connect the scope to TP1 (V rate).
(3).Adjust the vertical size control (VR603) so that the beat in the signal is minimized.
After adjustment, there should be a maximum of one beat per envelope.
(4).Aim the camera at a small object so that the object is in the center of the monitor screen.
(5).Adjust the vertical centering control (VR602) so that the small object does not shift vertically when the zoom in and out are repeated a few times.

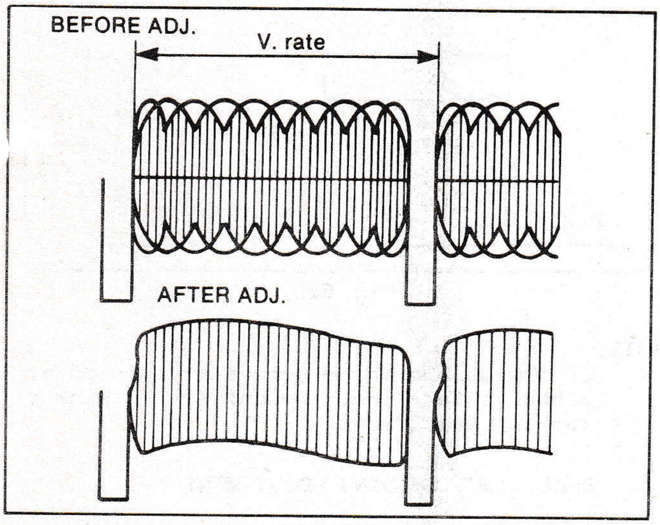


Fig.E15

11. HORIZONTAL SIZE/LINEARITY ADJUSTMENT

11-1.SIMPLIFIED ADJUSTMENT OF HORIZONTAL SIZE/LINEARITY

TP	ADJ.	LENS CAP	CHART
TP6	VR605 VR607 VR608	NO	WHITE CHART

M. EQ.	SPEC.
OSCILLOSCOPE	LEVEL IS MINIMIZED. WAVEFORM IS FLAT.

(1).Aim the camera at the white chart.
(2).Connect the oscilloscope to TP6 (H. rate).
(3).Adjust the horizontal size control (VR605) so that the carrier (3.9MHz) on the center portion is minimized
(4).Adjust the horizontal linearity 1 (VR607) and 2 (VR608) so that the waveform is flat.

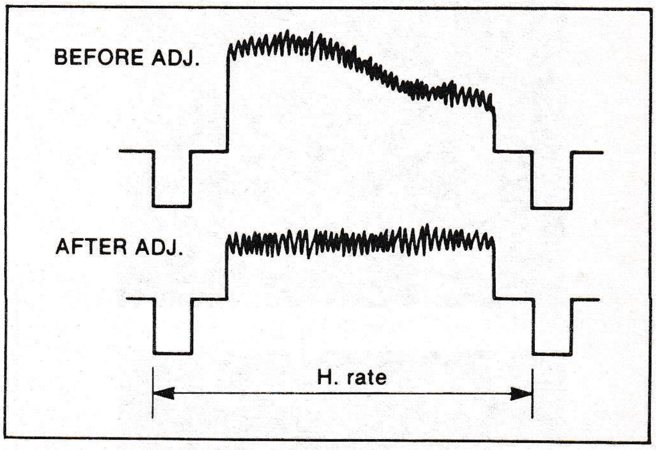


Fig.E16

11-2.COMPLETE ADJUSTMENT OF HORIZONTAL SIZE/LINEARITY

TP	ADJ.	LEND CAP	CHART
TP6	VR605 VR607 VR608	NO	WHITE CHART

M. EQ.	SPEC.
OSCILLOSCOPE	BLK AND CARRIER ARE EQUALLED WAVEFORM IS FLAT

(1). Aim the camera at the white chart.
(2). Set the FM Detector (VFKS001C) to Horizontal Size and Linearity position and 3.9MHz position.
(3). Connect the FM Detector input to TP1, output to the oscilloscope input, blanking to TP16, +B to TP15 and ground to camera GND.

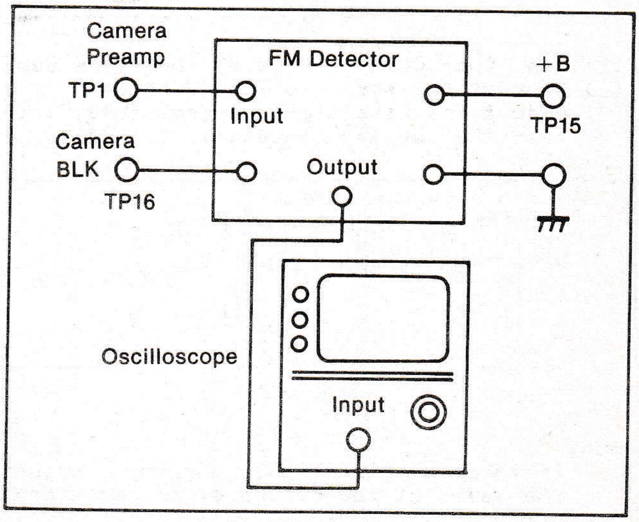


Fig. E17

(4). Adjust the Horizontal Size (VR605) so that the carrier on the center portion and blanking level are equalled.
(5). Then adjust the Horizontal Linearity 1 (VR607) and 2 (VR608) so that the waveform is flat.

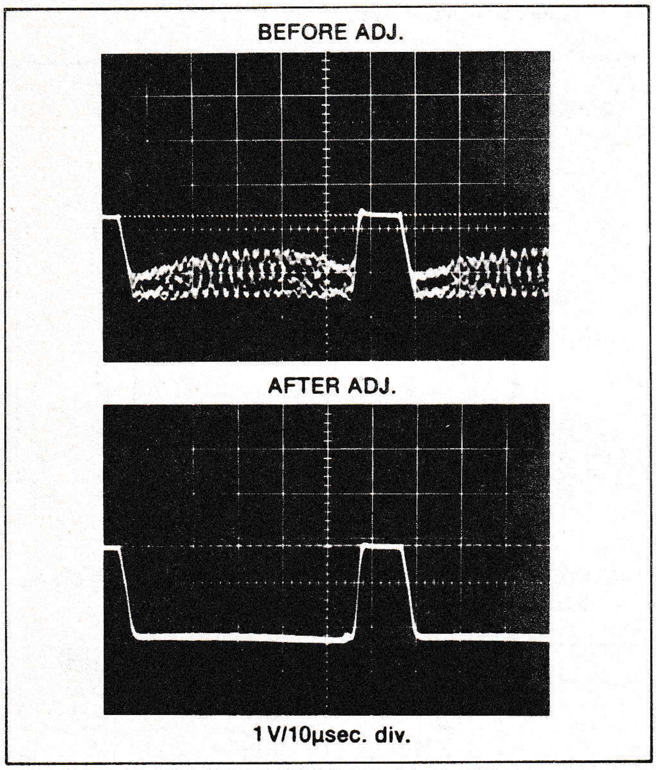


Fig.E18

12. BIAS LIGHT ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP1	VR612	YES	
M. EQ.		**SPEC.**	
OSCILLOSCOPE		20mV±4mV	

(1).Cap the Camera Lens by the Lens Cap.
(2).Connect the scope to TP1 (V.rate).
(3).Adjust the bias light control (VR612) so that the waveform level is 20 +- 4mV.

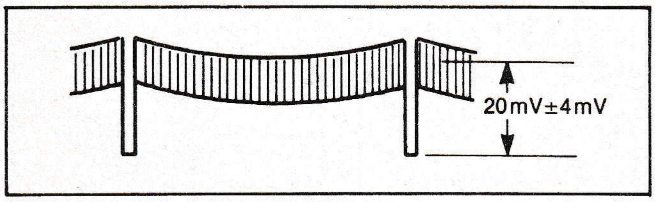


Fig. E19

Note:
1. If there is bias light shading, adjust the level at the center of the waveform.

2. Use 1:1 prove for easier adjustment.

13. HORIZONTAL CENTERING ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP1 TP10	VR606	NO	WHITE CHART
M. EQ.		**SPEC.**	
OSCILLOSCOPE		1.8µsec.±0.1µsec.	

(1).Aim the camera at the white chart.
(2).Connect the CH1 of the scope to TP1 and CH2 to TP10 (CP1 signal).
(3).Use the TP10(CP1) signal for scope trigger and observe the horizontal blanking interval of the signal using the delay mode of the scope.
(4).Adjust the horizontal centering control (VR606), so that the time between the trailing edge of the video signal and the raising edge of the clump pulse 1 signal is 1.8u + - 0.1 usec.

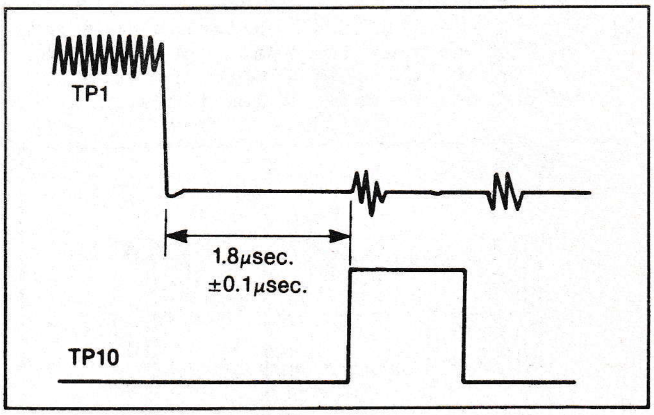


Fig. E20

NOTE:
If the double trace occurs at the end of a horizontal line, reconfirm the pickup turning adjustment.

14. BIAS LIGHT SHADING ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP2	VR411 (H) VR412 (H) VR202 (V) VR203 (V)	YES	
M. EQ.		**SPEC.**	
OSCILLOSCOPE		WAVEFORM IS FLAT.	

(1).Cap the Camera Lens by the Lens Cap.
(2).Connect the oscilloscope to TP2 (H.rate).
(3).Adjust the dark shading controls (VR411 and VR412) so that the waveform is flat.

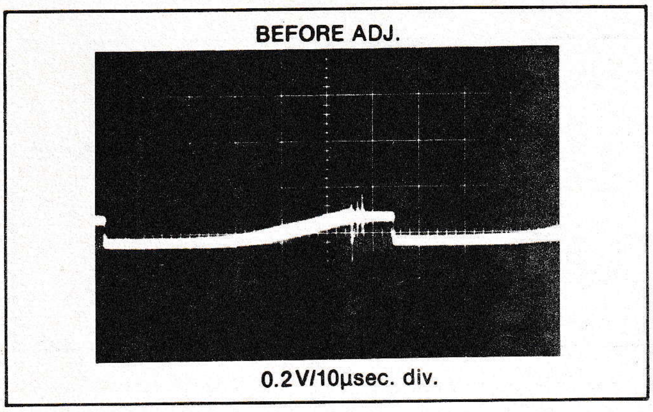


Fig. E21

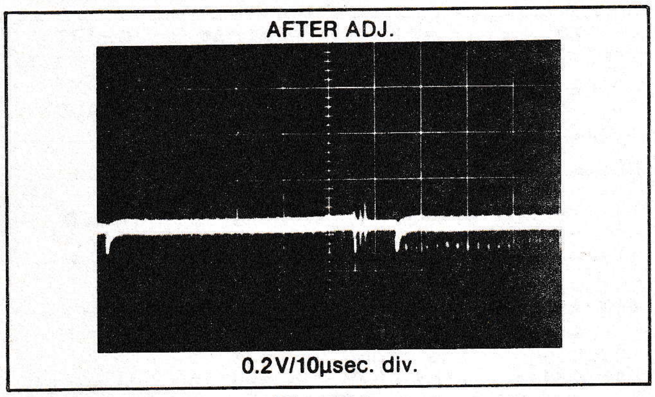


Fig. E22

(4).Trigger the scope at V. rate.
(5).Adjust the dark shading controls (VR202 and VR203) so that the waveform is flat.

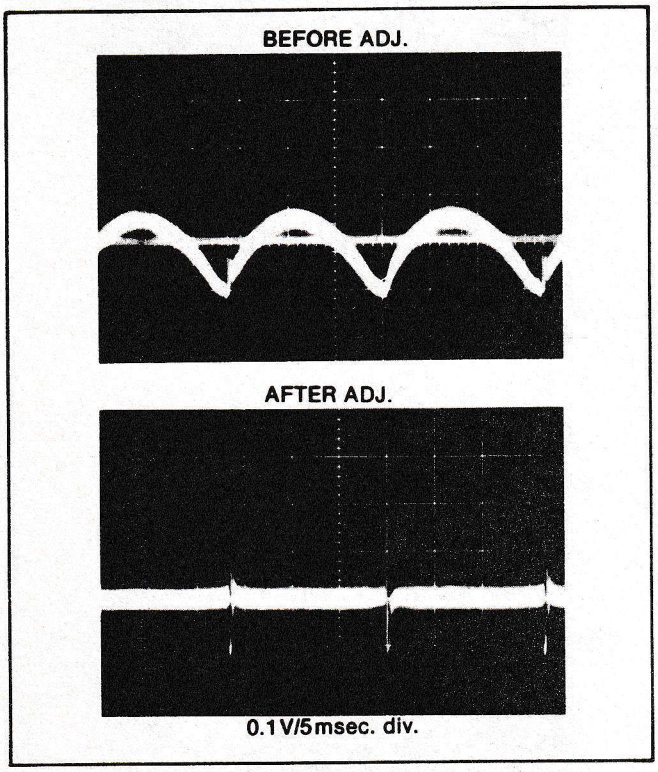


Fig. E23

15. PEDESTAL LEVEL ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP2	VR201	YES	
M. EQ.		SPEC.	
OSCILLOSCOPE		SIGNAL LEVEL EQUALS WITH THE BLK LEVEL.	

(1).Cap the Camera Lens by the Lens Cap.
(2).Connect the scope to TP2 (H. rate).
(3).Adjust the dark control (VR201) so that the signal level equals with the blanking level.

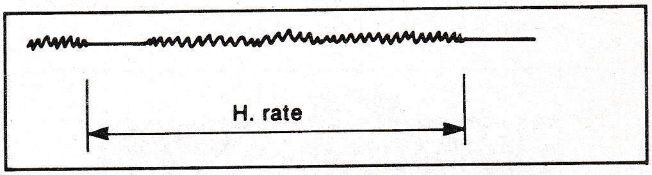


Fig. E24

16. ALC/AGC ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP1	VR204	NO	GRAY SCALE
TP2	VR205		
M. EQ.		SPEC.	
OSCILLOSCOPE		0.5V±0.02Vp-p	
		0.5V±0.02Vp-p	

(1).Aim the camera at the gray scale chart.
(2).Connect the scope to TP1 (H. rate).
(3).Adjust the ALC control (VR204) so that the signal level is 0.5 +- 0.02Vp-p.

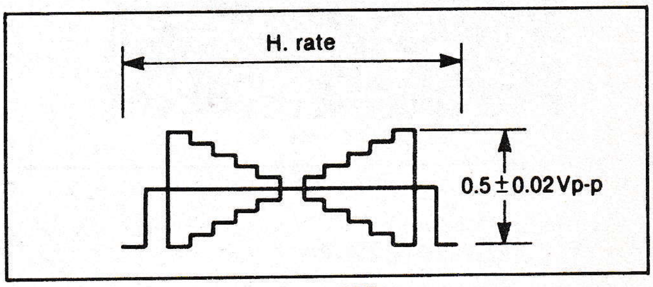


Fig. E25

(4).Connect the scope to TP2 (H. rate).
(5).Adjust the AGC control (VR205) so that the signal level is 0.5 +- 0.02Vp-p.

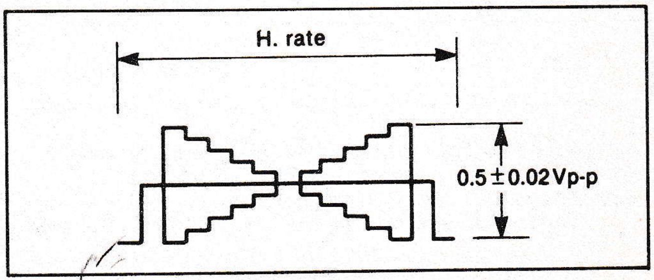


Fig. E26

17. VERTICAL EDGE BALANCE AND CCD BIAS ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP3	VR405 VR406	NO	GRAY SCALE

M. EQ.	SPEC.
OSCILLOSCOPE	CANCEL THE VIDEO SIGNAL.

(1).Aim the camera at the gray scale chart.
(2).Connect the scope to TP3 (H.rate).
(3).Adjust the vertical edge balance control (VR405) and the CCD bias control (VR406) to cancel the video signal.

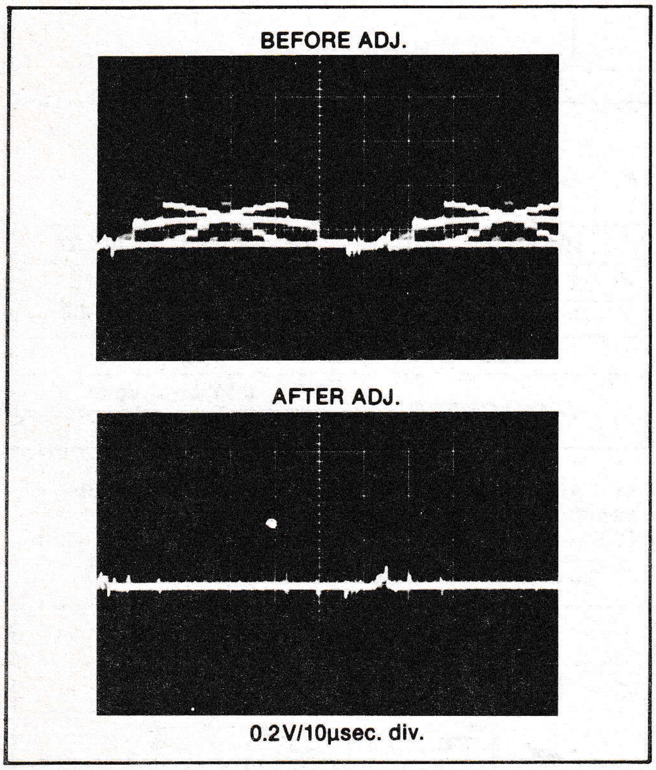


Fig. E27

18. YH GAIN ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP6	VR304	NO	GRAY SCALE

M. EQ.	SPEC.
OSCILLOSCOPE	1.75V±0.05Vp-p

(1).Aim the camera at the gray scale chart.
(2).Connet the scope to TP6 (H.rate).
(3).Adjust the YH gain control (VR304) so that the signal level is 1.75+-0.05Vp-p

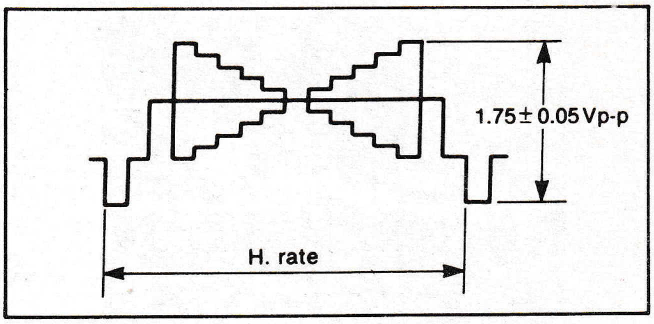


Fig. E28

19. R/B. SEPARATION ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP21	VR303 C305	NO	GRAY SCALE

M. EQ.	SPEC.
OSCILLOSCOPE	NOISE IS MINIMIZED

(1).Aim the camera at the logarizmic gray scale
(2).Connect the scope to TP21 (H.rate).
(3).Adjust the R/B separation controls (VR303 and C305) so that the noise component is minimized.

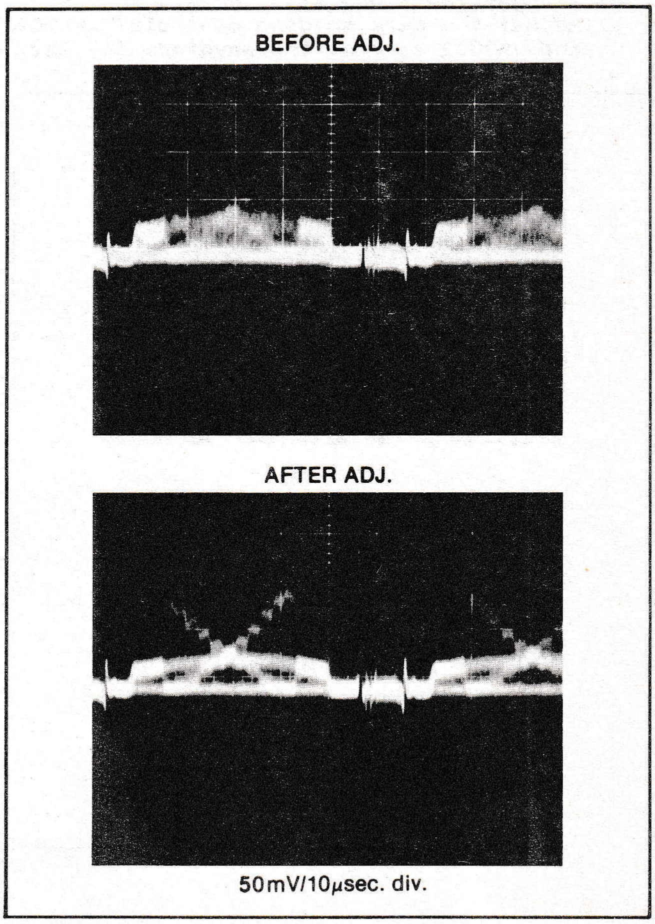


Fig. E29

20. DYNAMIC FOCUS ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP4	VR409 (H) VR410 (H) VR408 (V) VR407 (V)	NO	WHITE CHART
M. EQ.		**SPEC.**	
OSCILLOSCOPE		WAVEFORM IS FLAT.	

(1).Aim the camera at the white chart.
(2).Connect the scope to TP4. (H.rate)
(3).Adjust the dynamic focus controls for H. rate (VR409 and VR410)so that the waveform is flat as possible.

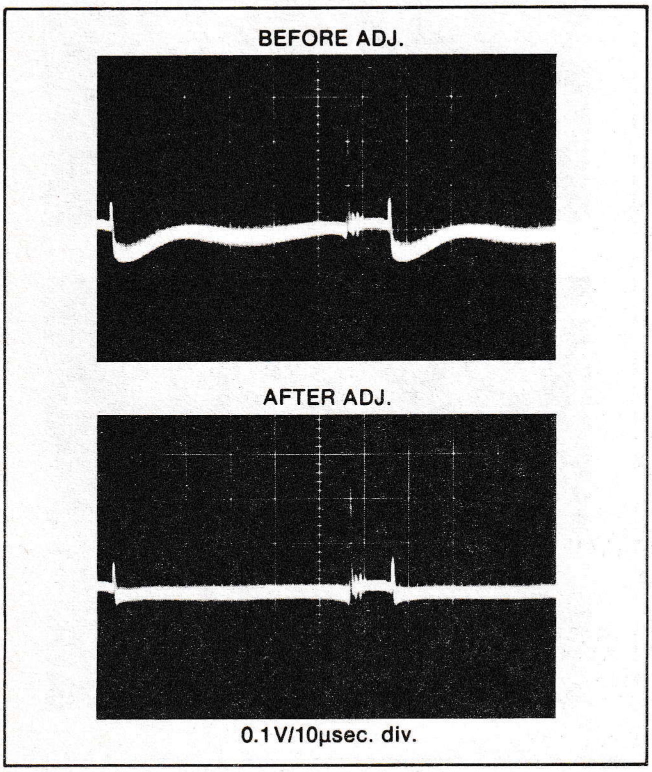


Fig. E30

(4).Change the scope trigger to V. rate.
(5).Adjust the dynamic focus controls for V.rate (VR408 and VR407) so that the waveform is flat as possible.
(6).Return the scope trigger to H.rate.
(7).Turn the focus contral (VR610) and readjust VR409 and VR410 so that the signal level decreases flatly.
(8).Change the scope trigger to V. rate again.
(9).Readjust VR408 and VR407 by same method with H.rate.
(10).Readjust the focus control (VR610). Refer to item 6.

21. COLOR SHADING COMPENSATION ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP4 (R-Y) TP5 (B-Y)	VR310~313 VR317~320	NO	WHITE CHART
M. EQ.		**SPEC.**	
OSCILLOSCOPE		WAVEFORM IS FLAT.	

(1).Aim the camera at the white chart.
(2).Connect the scope to TP4 and observe the R-Y signal at H.rate.
(3).Adjust the color shading controls for H.rate (VR312 and VR313) so that the waveform is flat as possible.

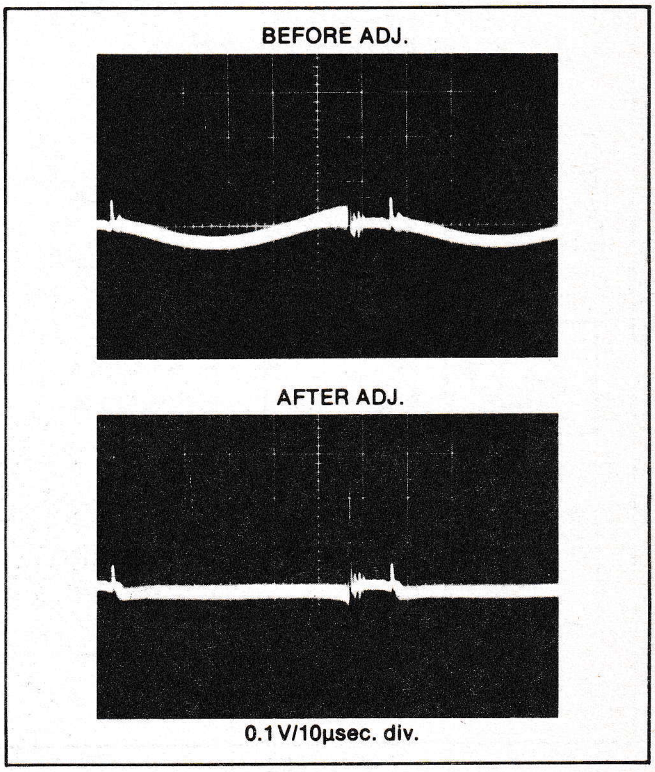


Fig. E31

(4).Trigger the scope at V.rate.
(5).Adjust the color controls for V.rate (VR310 and VR311)so that the waveform is flat as possible.
(6).Change the scope to TP5 to observe the B-Y signal.
(7). Alternately adjust the color shading controls (VR319 and VR320 in the H.rate , VR317 and VR318 in the V.rate) so that waveform is flat.

Note:

To adjust easily, observe the color monitor and if shading occurs as shown below, adjust following controls.

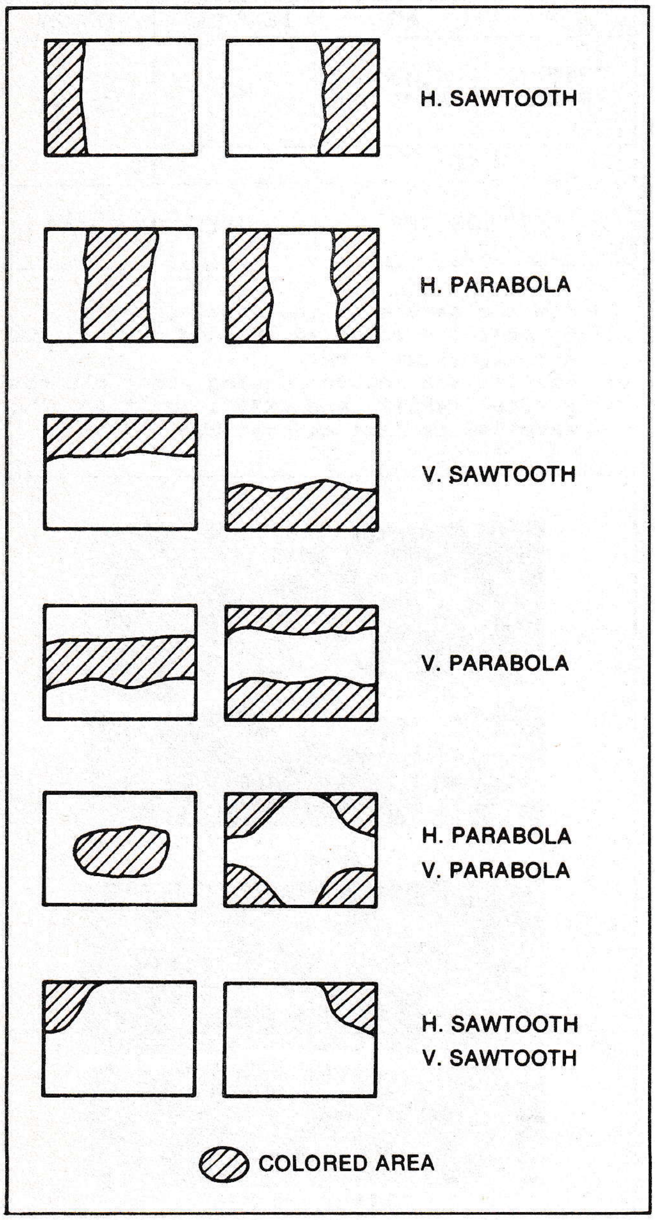


Fig. E32

22. COLOR DIFFERENCE SIGNAL PEDESTAL PRESET ADJUSTMENT

WITH VECTOR SCOPE

TP	ADJ.	LENS CAP	CHART
VIDEO OUTPUT	VR322 VR323	YES	
M. EQ.		SPEC.	
VECTOR SCOPE		VECTORS CENTER	

(1).Cap the Camera Lens by the Lens Cap.
(2).Supply the video signal taken from the VCR section to the vector scope.
(3).Adjust the pedestal controls (VR322 and VR323) so that the color vectors are collected the center on the vector scope.

Note:

The vector scope has to be terminated, during adjusting.

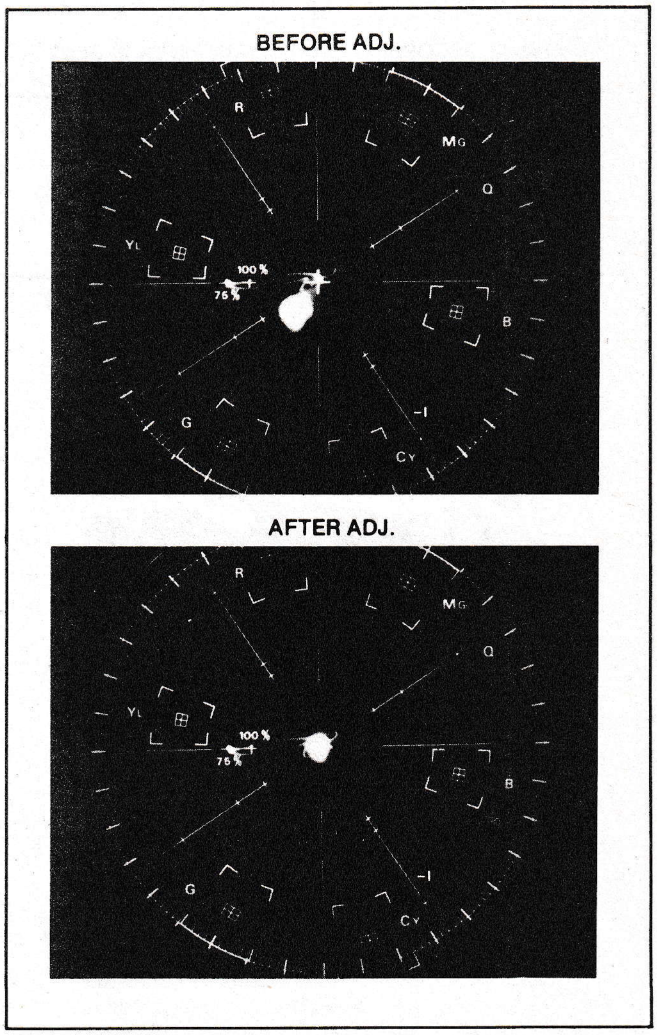


Fig. E33

WITH OSCILLOSCOPE

TP	ADJ.	LENS CAP	CHART
TP9	VR322 VR323	YES	
M. EQ.		SPEC.	
OSCILLOSCOPE		WAVEFORM IS MINIMIZED.	

(1).Cap the Camera Lens by the Lens Cap.
(2).Connect the scope to TP9 (H.rate).
(3).Adjust the pedestal controls (VR322 and VR323) so that the waveform is minimized.

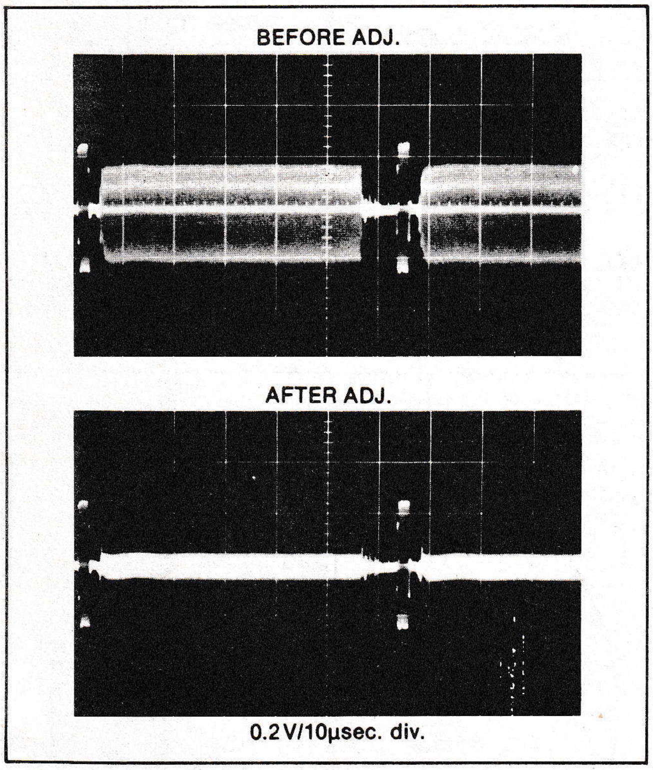


Fig.E34

23. R/B GAIN AND YL PEDESTAL ADJUSTMENT

WITH VECTOR SCOPE

TP	ADJ.	LENS CAP	CHART
VIDEO OUT	VR302 VR321	NO	GRAY SCALE
M. EQ.		**SPEC.**	
VECTOR SCOPE		VECTOR ARE COLLECTED CENTER.	

(1). Aim the camera at a gray scale chart.
(2). Supply the video output to the vector scope.
(3). Adjust the R/B gain control (VR302) and the YL pedestal control (VR321) so that the vectors are collected center as possible.

WITH OSCILLOSCOPE

TP	ADJ.	LENS CAP	CHART
TP4	VR302 VR321	NO	GRAY SCALE
M. EQ.		**SPEC.**	
OSCILLOSCOPE		WAVEFORM IS MINIMIZED (REFER TO FIG. E32)	

(1).Aim the camera at a gray scale chart
(2).Connect the scope to TP4.
(3).Adjust the R/B gain control (VR302) and YL pedestal control (VR321) so that the waveform is as shown below.

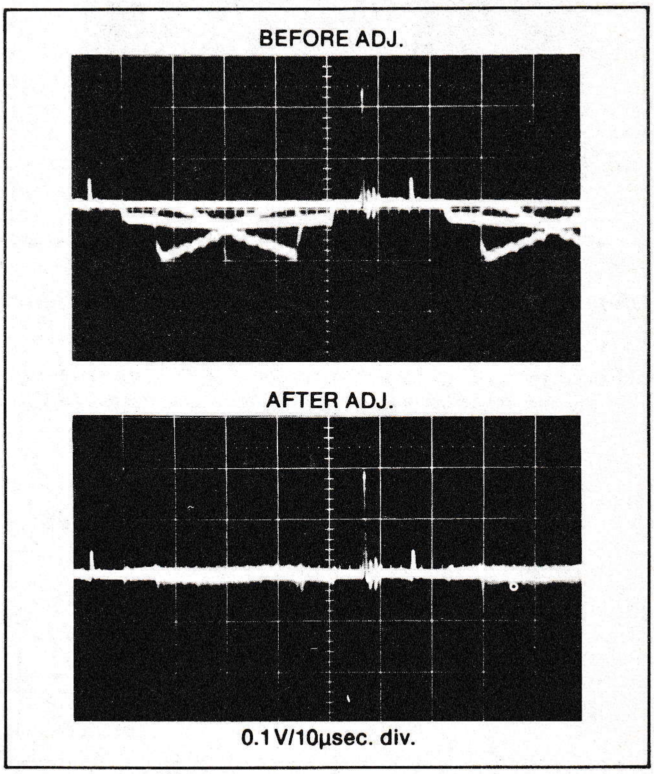


Fig.E35

24. R/B GAMMA ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
TP4 TP5	VR306~308 VR314~316	NO	GRAY SCALE
M. EQ.		**SPEC.**	
OSCILLOSCOPE		WAVEFORM IS MINIMIZED.	

(1).Aim the camera at the gray scale chart.
(2).Connect the scope to TP4 (H. rate).
(3).Adjust the R gamma 1 (VR307) so that the 1st~4th step is flat as shown below.
(4).Adjust the R gamma 2 (VR308) so that the 7th~8th step is flat.

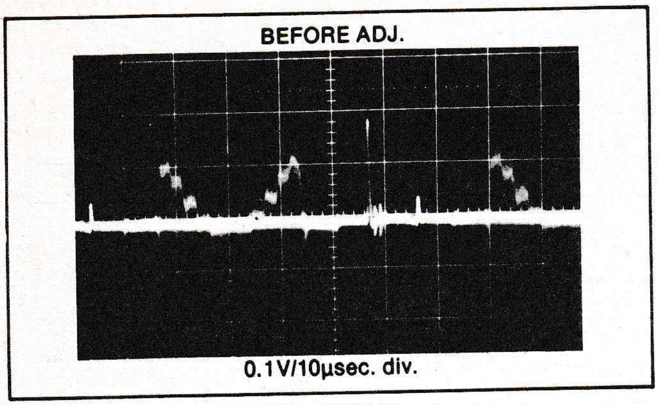


Fig. E36(A)

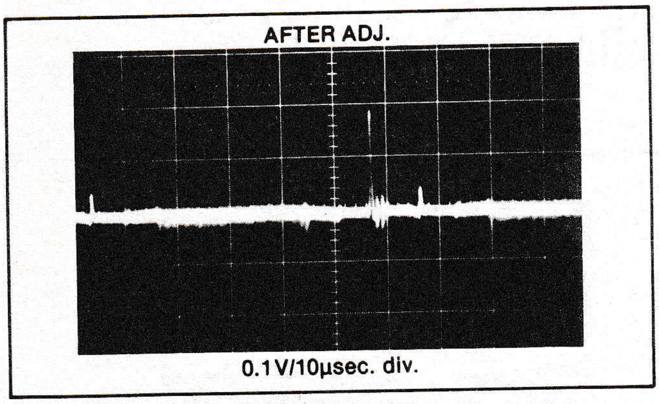


Fig. E36(B)

(5).Adjust the R gamma 3 (VR306) so that the 9th~11th step is flat.
(6).Connect the scope to TP5. (H.rate)
(7).Adjust B gamma controls (VR314~VR316) by same method with the R gamma adjustment.

VR315	1st-4th step
VR314	7th-8th step
VR310	9th-11th step

Note:
After adjustment of thease controls, readjust the R/B gain (VR302) and YL pedestal control (VR321) again.

25. VERTICAL EDGE ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
VIDEO OUTPUT	VR301	NO	GRAY SCALE
M. EQ.		**SPEC.**	
TV MONITOR		COLOR ERROR IS ELIMINATED.	

(1).Aim the camera at the gray scale chart.
(2).Observe the picture on the color monitor and adjust the vertical edge gain control (VR301) until the color fringing on the upper and lower edge of the gray scale is eliminated.

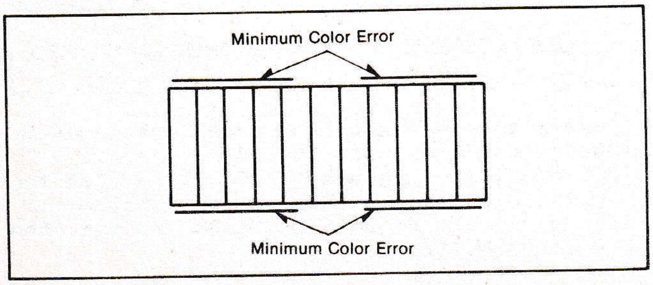


Fig. E37

26. COLOR PHASE AND CHROMA GAIN ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
VIDEO OUTPUT	VR414 VR413 VR415 VR403	NO	COLOR CHART
M. EQ.		**SPEC.**	
VECTOR SCOPE		REFER TO FIG. E38 FIG. E39	

(1).Aim the camera at the color bar chart.
(2).Supply the video signal to the vector scope.
(3).Adjust the color phase controls (VR413, VR415, VR414 and VR403) so that the vector of each color is shown below.
(4). Adjust the chroma gain control (VR401) so that the red vector is 160% +- 10% as compares to the burst signal or the vector scope.

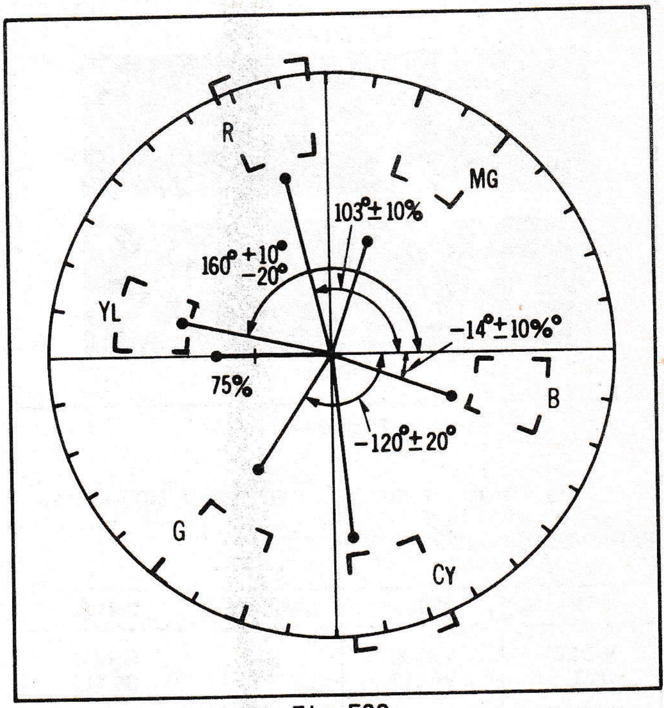


Fig.E38

27. HIGH INTENSITY SUPPRESS ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
VIDEO OUTPUT	VR404	NO	GRAY SCALE
M. EQ.		**SPEC.**	
OSCILLOSCOPE		GREEN IS ELIMINATED	

(1).Aim the camera at a gray scale chart.
(2).Push the Back Light button and keep it.
(3).Observe the picture on the monitor and adjust the high intensity suppress control (VR404) so that the green color portion is eliminated.

28. AWC OFF SET ADJUSTMENT

Before adjustment, Confirm the R/B Balance Control (VR01) on the operation P.C.B to the mechanical center.

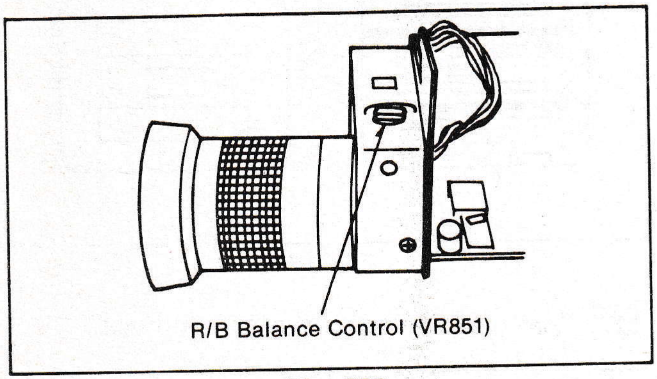


Fig. E39

WITH VECTOR SCOPE

TP	ADJ.	LENS CAP	CHART
VIDEO OUTPUT	VR504 VR505	NO	White Chart
M. EQ.		SPEC.	
VECTOR SCOPE		VECTORS COLLECT TO CENTER.	

(AUTO)

(1).Aim the camera at the white scale chart and set the light of the light box to 3200degrees K.

(2).Supply the video signal from VCR section to the vector scope.

(3).Set the AWB Switch to Auto position.

(4).Adjust the AWC (AUTO) offset controls (VR504 and VR505) so that the color signal vectors are collected at the center on the vector scope.

TP	ADJ.	LENS CAP	CHART
VIDEO OUTPUT	VR501 VR502	NO	WHITE CHART
M. EQ.		SPEC.	
VECTOR SCOPE		VECTORS COLLECT TO CENTER	

(FIXED)

(1).Aim the camera at the white chart and set the light of the light box to 5500 degrees K.

(2).Supply the video signal from VCR section to the vector scope.

(3).Set the AWB Switch to FIXED position.

(4).Set the Indoor/Outdoor Switch to Outdoor position.

(5).Adjust the AWC (FIXED) off set controls (VR501 and VR502) so that the color signal vectors are collected at the center on the vector scope.

WITH OSCILLOSCOPE

TP	ADJ.	LENS CAP	CHART
TP9	VR504 VR505	NO	White Chart
M. EQ.		SPEC.	
OSCILLOSCOPE		WAVEFORM IS MINIMIZED.	

(AUTO)

(1).Aim the camera at the gray scale chart and set the light of the light box to 3200degrees K.

(2).Connect the scope to TP9(H.rate).

(3).Set AWB Switch to AUTO position.

(4).Adjust the AWC (AUTO) offset controls (VR504 and VR505) so that the color signal waveform is minimized.

TP	ADJ.	LENS CAP	CHART
TP9	VR501 VR502	NO	WHITE CHART
M. EQ.		SPEC.	
OSCILLOSCOPE		WAVEFORM IS MINIMIZED	

(FIXED)

(1).Aim the camera at the gray scale chart and set the light of the light box to 5500 degrees K.

(2).Connect the scope to TP9 (H.rate).

(3).Set the AWB Switch to FIXED position.

(4).Set the Indoor/Outdoor Switch to Outdoor position.

(5).Adjust the AWC (FIXED) off set controls (VR501 and VR502) so that the color signal waveform is minimumized.

PREPARATION

The following adjustments are for the electronic view finder.

(1).Connect the view finder connector to the EVF connector on the unit.

(2).The camera circuit must be completely aligned before viewfinder adjustment is made.

29. HORIZONTAL HOLD ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
PIN 22 OF IC901	VR905		
M. EQ.		SPEC.	
FREQUENCY COUNTER		15.7kHz±0.2kHz	

(1).Connect the frequency counter to pin 22 of IC901.

(2).Adjust the horizontal hold contro (VR905) so that the frequency is 15.7 KH + -0.2kHz.

30. PICTURE TILT ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
VIEW FINDER	DEFLECTION COIL	YES	
M. EQ.		**SPEC.**	
VIEW FINDER		RASTER IS STRAIGHT.	

(1).Reduce picture size using the EVF V.size (VR904) and H.size (TF901).
(2).Loosen the deflection coil holding screw.
(3).Cap the Camera Lens by the Lens Cap.
(4).Observe the viewfinder, and turn the deflection coil until the raster is straight.
(5).Tighten the deflection coil holding screw.

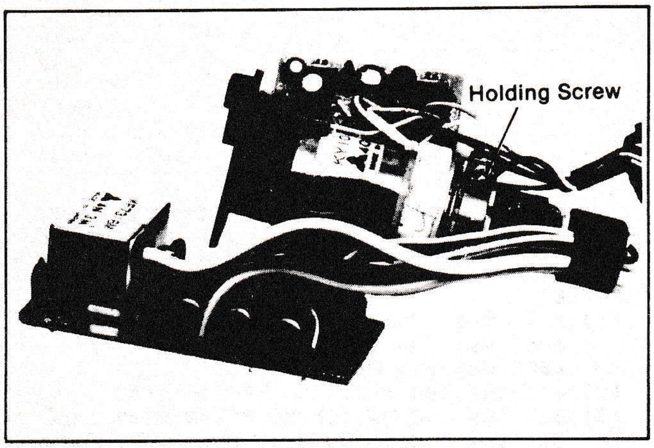


Fig. E40

31. EVF V.SIZE AND H.SIZE ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
	TF901 VR904	NO	GRAY CHART
M. EQ.		**SPEC.**	
VIEW FINDER		DISAPPER THE GRAY CHART EDGE TRUE CIRCLE.	

(1).Aim the camera at the gray chart, and line up the reference arrow head with edge of the raster (blanking) on the view finder.
(2).Adjust the H.size (TF901) until the gray chart edge just disappear (blanking) or the view finder.

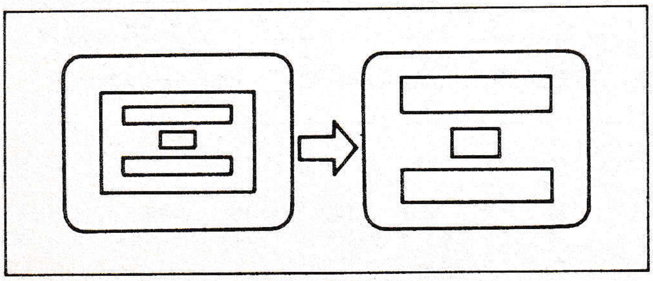


Fig. E41

(3).Then adjust the V.size (VR904) so that the vertical period on the E.V.F. is fixed.

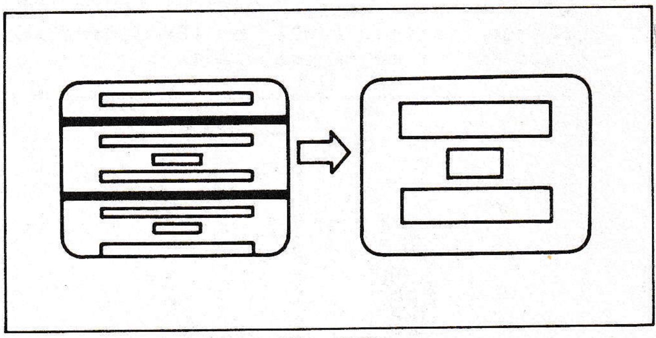


Fig. E42

32. CONTRAST AND BRIGHTNESS ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
	VR902 VR903	NO	GRAY SCALE
M. EQ.		**SPEC.**	
VIEW FINDER		NATURAL GRADATION	

(1).Aim the camera at the gray scale chart.
(2).Adjust the contrast control (VR903) and brightness control (VR902) so that the black and white gradation will be the same on the view finder screen as that in the monitor.

33. FOCUS ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
	VR901	NO	REGISTRATION CHART
M. EQ.		**SPEC.**	
VIEW FINDER		BEST RESOLUTION	

(1).Aim the camera at the registration chart.
(2).Adjust the focus control (VR901) for best resolution in the view finder.

PREPARATION

The following adjustment are for the Auto Focus Unit

(1).Connect the Camera unit with the Video Recorder unit by using the Extension (VFKW0028)
(2).After do these adjustment items, confirm the Focus adjustment and Back Focus adjustment.
(3).To perform adjustment of Auto Focus section, set the Auto Focus Switch to ON position.

SERVICING FIXTURES

1. Auto Focus Jigs Set
   (Part No.: VFKW0006) 29-1713-84
   Precision Driver
   (Part No.: VFKW0006A) 29-1714-84
   Diffusion Cap
   (Part No.: VFKW0006B) 29-1715-84
   Infrared Ray Detect Camera
   (Part No.: VFKW0006C) 29-1716-84
   Adjustment Driver
   (Part No.: VFKW0006D) 29-1717-84
2. Infrared Ray Position Chart (2)
   (Part No.: VFKW0008) 29-1720-84
3. Gray Chart
   (Part No.: VFKW0009) 29-1721-84
4. IR-LED Adjustment Driver
   (Part No.: VFKW0029)

34. INFRARED EMITTING DIODE (IRED) RAYS ADJUSTMENT

TP	ADJ.	IRIS CAP	CHART
	IRED POSITION BAR	NO	INFRARED RAY POSITION (II) CHART
M. EQ.		SPEC.	
TV MONITOR		INFRARED RAYS ARE HIT TO CENTER OF CHART	

(1). Aim the camera at the infrared ray position chart after fix the distance between chart and camera is 9 feed (3m). (Zoom at the TELE side)

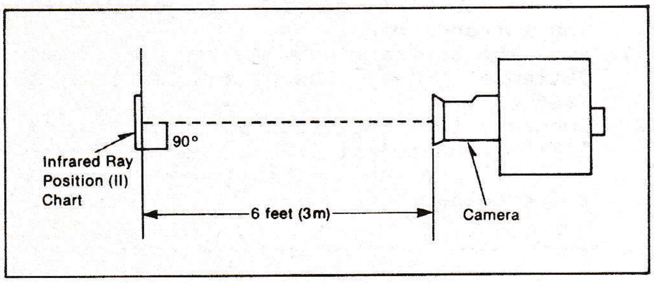


Fig. E43

(2). Adjust the camera angle so that the center portion of the infrared ray position chart is center on the monitor.
(3). Connect a jumper between pin 7 and pin 14 of IC5101 to continue projection of the infrared rays.
(4). Aim the infrared detect camera at the same infrared ray position chart (2) and observe the infrared rays on the monitor.
(5). Loosen the screws (A) and adjust the IRED position bar so that the just refrected position of the infrared rays becomes center of chart by moving left or right directions.

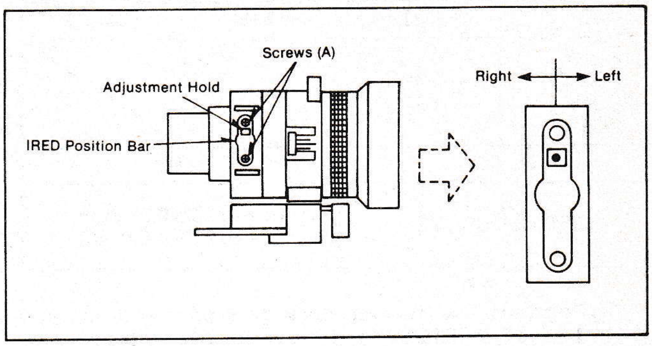


Fig. E44

(6). Remove a jumper.

Note:
1. To adjust this adjustment IR-LED Adjustment Driver (VFKW0029) have to be used.
   However, also a pair of tweezers is possible to performe this adjustment.

35. SILICON PHOTO DIODE (SPD) POSITION ADJUSTMENT

TP	ADJ.	IRIS CAP	CHART
	SPD POSITION SCREW	NO	INFRARED RAY POSITION (II) CHART
M. EQ.		SPEC.	
FOCUS LING SCALE		SCALE ON FOCUS LING IS SET TO "3m" POSITION	

(1). Aim the camera at the infrared ray position chart after fix the distance between chart and camera is 9 feet (3m).
(2). Zoom at the TELE side and adjust the SPD position Screw so that the scale on the Focus Ling is set to "3m" position as below.

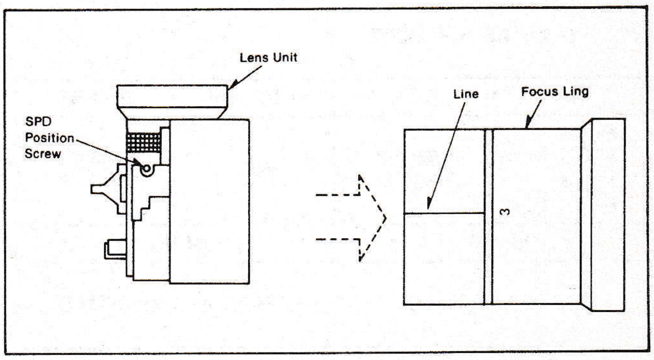


Fig. E45

36. OFF SET ADJUSTMENT

TP	ADJ.	IRIS CAP	CHART
PIN 6 (IC5101) PIN 9 (IC5101)	VRA VRB	NO	
M. EQ.		SPEC.	
OSCILLOSCOPE		(A+B) 2.7±0.05 Vp-p (A−B) 2.7±0.02 Vp-p	

(1).Connect a jumper between pin 7 and pin 14 of IC5101 to continue projection of the infrared rays.
(2).Cover the SPD window by using a black paper.
(3).Connect the oscilloscope to pin 6 of IC5101 and observe the integral wavefrom (A+B).
(4).Adjust the A+B Off Set control (VR A) so that the waveform level is 2.7 +- 0.05 V p-p.
(5).Change to connect the oscilloscope to pin 9 of IC5101 and observe the integral waveform (A-B).
(6).Adjust the A-B Off Set control (VR B) so that the waveform level is 2.7 +- 0.02 Vp-p.

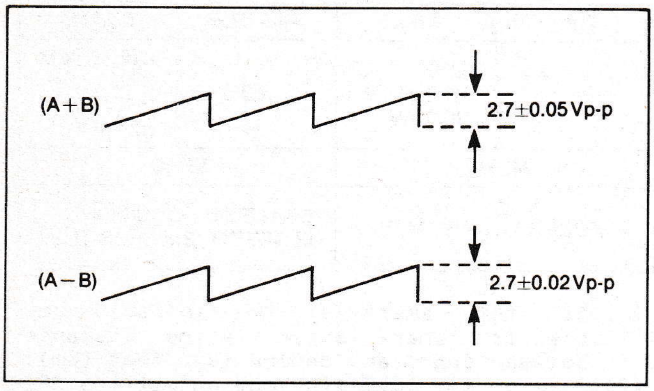


Fig. E46

(7).Remove a jumper.

37. GAIN ADJUSTMENT

TP	ADJ.	IRIS CAP	CHART
PIN 6 (IC5101) PIN 9 (IC5101)	VR5102 VR5103	NO	GRRY CHART
M. EQ.		SPEC.	
OSCILLOSCOPE		PRIOD A IS SHORTED	

Note:
a. Adjust this adjustment when only IC5101 is replaced.
(1).Connect a jumper between pin 7 and pin 14 of IC5101 to continue projection of the infrared rays.
(2).Aim the camera at the gray chart that distance between camera and chart is 6 feet (3m).
(3). Connect the oscilloscope to pin 6 of IC5101 and adjust the A+B Gain control (VR5102) so that the priod A is shorted.
(4).Change to connect the oscilloscope to pin 9 of IC5101 and adjust the A-B Gain control (VR5103) so that the same as A+B Gain control adjustment method.

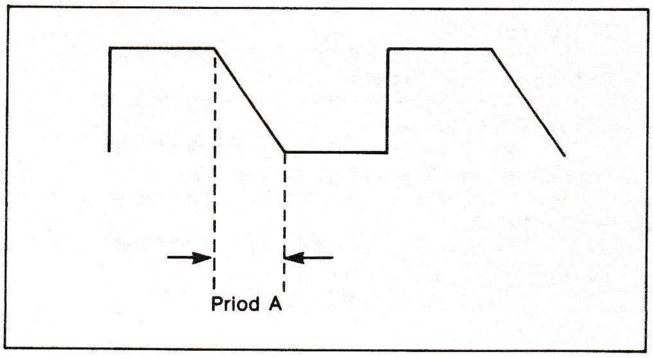


Fig.E47

(5).Remove a jumper.

38. INFRARED EMITTING DIODE (IRED) CURRENT ADJUSTMENT

TP	ADJ.	LENS CAP	CHART
PIN 6 OF IC5101	VR5101	NO	WHITE CHART
M. EQ.		SPEC.	
OSCILLOSCOPE		SLOPE PORTION IS LESS THAN 1 msec.	

(1). Connect a jumper between pin 7 and pin 14 of IC5101 to continue projection of the infrared rays.
(2). Aim the camera at the white chart that distance between camera and chart is 6 feet (3m).
(3). Connect the oscilloscope to pin 6 of IC5101 and adjust IRED current control (VR5101) so that the waveform is as shown below.

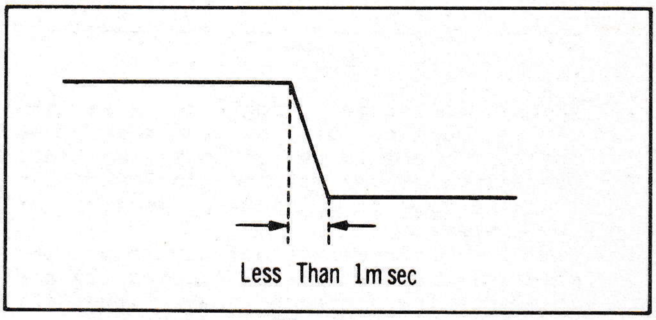


Fig. E48

4-2 ELECTRIC ADJUSTMENT FOR VTR SECTION

TEST EQUIPMENT AND TOOL

The following equipment is required for adjustment of the VTR section of VHS Movie

1. VTVM(Vacuum Tube Volt Meter) or DVM(Digital Volt Meter)
   Voltage Range : 0.001 ~ 50V
2. Dual Trace Oscilloscope
   Voltage Range : 0.005 ~ 50V/div.
   Frequency Range : DC ~ 10MHz
   Probe : 10:1 or 1:1
3. Frequency Counter
   Frequency Range : 0 ~ 10MHz
4. Signal Generator (Sinewave)
   Frequency Range : 0 ~ 10MHz
5. Video Sweep Generator
   Frequency Range : 0 ~ 10MHz
6. Lumi/Chroma Separator **29-1705-85**

   This is used to supply external video signal to a video recorder unit.

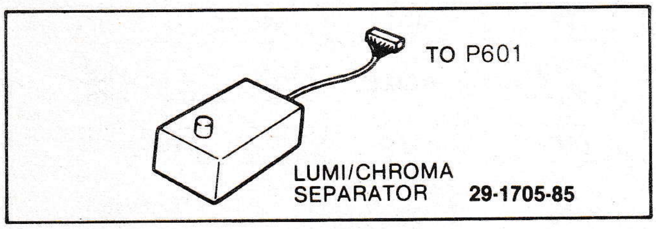


Fig. E49

7. Color Monitor TV
8. Plastic Tip Driver
9. VHS Alignment Tape (VFMS0001H6) **29-0542-79**

PREPARATION

1. Remove the casing panels and open the main circuit board.
2. Disconnect the connector between the camera section and VTR section.
3. Supply the video signal to the VTR unit using the Lumi/Chroma Separator (VFKS0047)

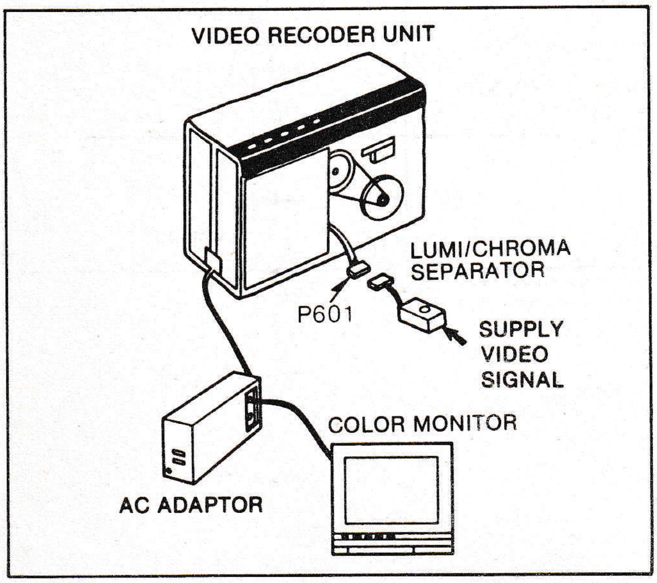
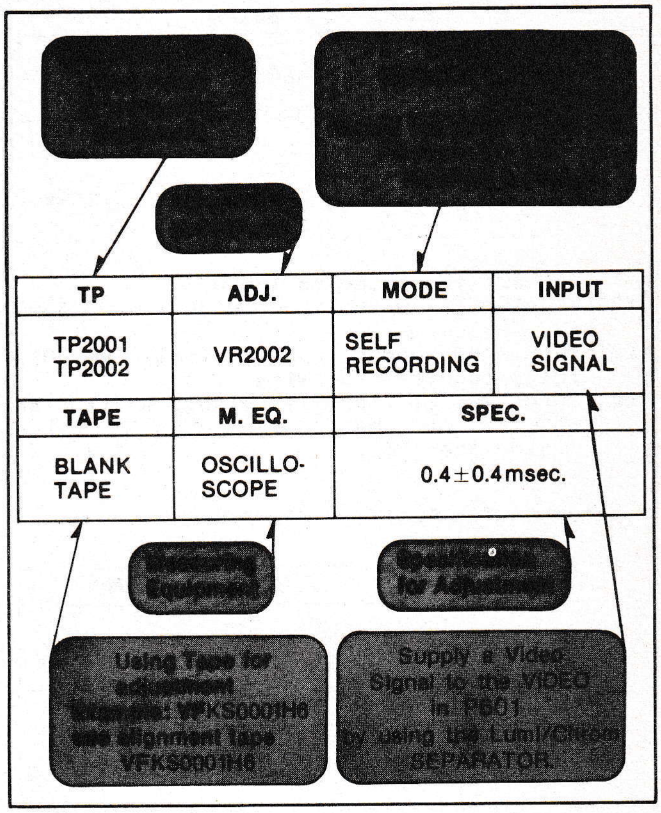


Fig. E50

HOW TO READ THE ADJUSTMENT PROCEDURE



TP	ADJ.	MODE	INPUT
TP2001 TP2002	VR2002	SELF RECORDING	VIDEO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	OSCILLO-SCOPE	0.4±0.4msec.	

Fig. E51

FOR TRIGGER

To trigger the scope, the following test point is used.

H. rate
TP3002
(Video Output)

V. rate
TP3005 or TP2005
(Head Switching Signal)

1. REG.+5V ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP1003	VR1003	STOP	
TAPE	**M. EQ.**	**SPEC.**	
	D.V.M.	5.1V±0.05V	

2. REG.+9V ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP1002	VR1002	STOP	
TAPE	**M. EQ.**	**SPEC.**	
	D.V.M.	9.2V±0.05V	

3. UNDER CUT ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP6009	VR6001	REC · PLAY	
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	OSCILLO-SCOPE	HIGH → PULSE → LOW	

(1).Connect the scope to TP6009.
(2).Supply the DC voltage 10.3V + - 0.05VDC to. TP1004
(3).Turn the under cut control (VR6001) fully counter clockwise.
(4).Turn VR6001 clockwise slowly until the wavefrm is changed from high to pulse train, then low.

4. CHARACTER POSITION ADJUSTMENT

TP	ADJ.	MODE	INPUT
VIEW FINDER	VR6002	STOP	
TAPE	**M. EQ.**	**SPEC.**	
	VIEW FINDER	CHARACTER IS CENTER.	

(1).Connect the EVF unit to the VTR unit.
(2).Display the battery remaining indicator and counter number on the EVF.
(3).Adjust the osc control (VR6002) so that the character position is shown below.

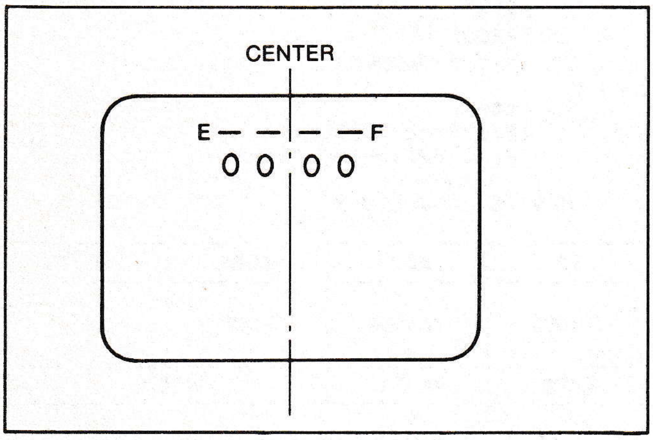


Fig.E52

5. P.G. SHIFTER ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP2005 TP3002	VR2001	PLAY	
TAPE	**M. EQ.**	**SPEC.**	
ALIGNMENT TAPE (VFKS0001H6)	OSCILLO-SCOPE	6V±1H	

(1).Playback the color bar section of the Alignment tape.

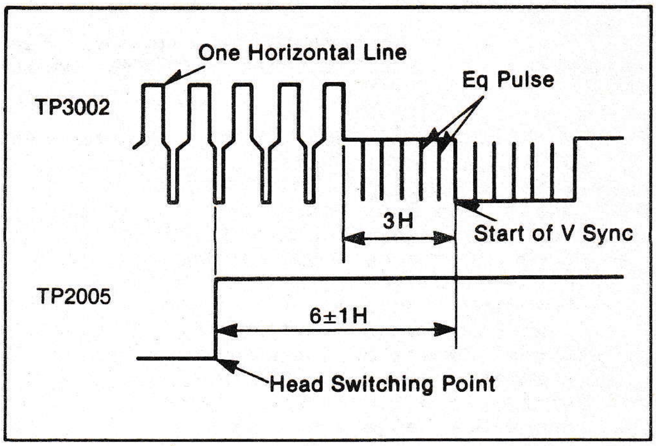


Fig.E53

6. TRACKING FIX ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP2005 TP2006	VR2002	SELF RECORDING	VIDEO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	OSCILLO-SCOPE	0.4±0.4msec.	

(1).Set the Tracking VR to the center fix position.
(2).Record for a few minutes, and playback the just recorded portion.
(3).Adjust the tracking fix control (VR2002) so that the period of "T" is 0.4 + - 0.4msec. as shown below.

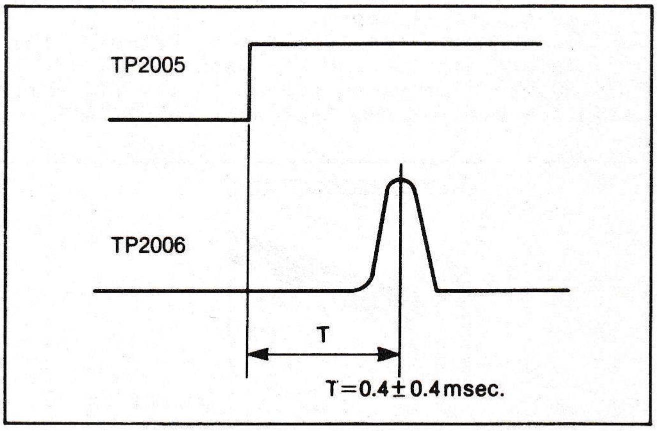


Fig. E54

7. BURST LEVEL ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3002	VR8001	STOP	VIDEO SIGNAL (COLOR BAR)
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	OSCILLO-SCOPE	570±20mVp-p	

(1).Connect the oscilloscope to TP3002.
(2).Adjust the Rec Current Control (VR3001) so that the FM (Luminance) signal is minimuized.
(3).Adjust the Burst Level control (VR8001) so that the burst level is 570 +- 20mVp-p.

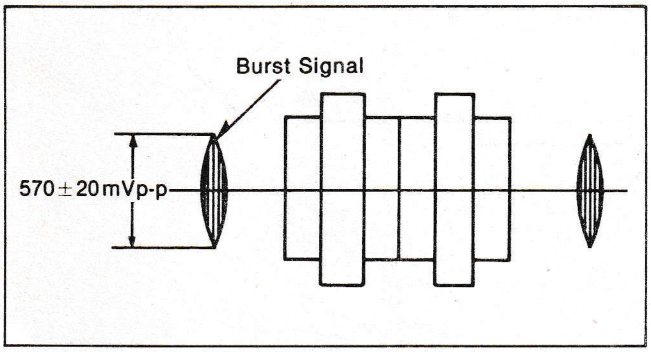


Fig.E55

Note:
After adjustment of Burst Level the Luminance Recording Current Adjustment must be performed.

8. LUMINANCE RECORDING CURRENT ADJUSTMENT

TP	ADJ.	MODE	INPUT
TP3503 (HOT) TP3504 (GND)	VR3001	REC·PLAY	VIDEO SIGNAL (COLOR BAR)
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	OSCILLO-SCOPE	290V±10mVp-p	

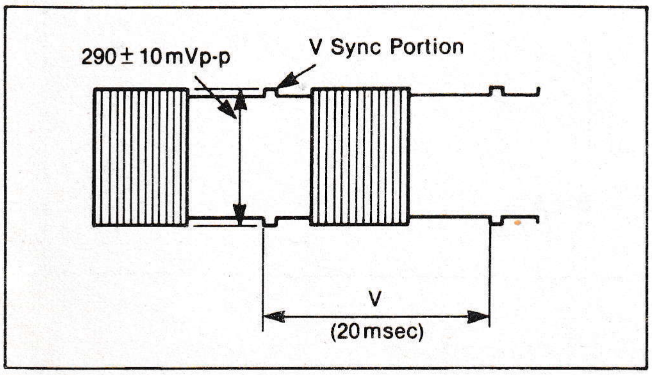


Fig.E56

9. AUDIO BIAS CURRENT ADJUSTMENT

TP	ADJ.	MODE	INPUT
AC HEAD TERMINAL	C4005	REC · PLAY	
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	D.V.M.	2.4±0.05mVrms	

(1).Connect the D.V.M to AC Head Terminal as below.

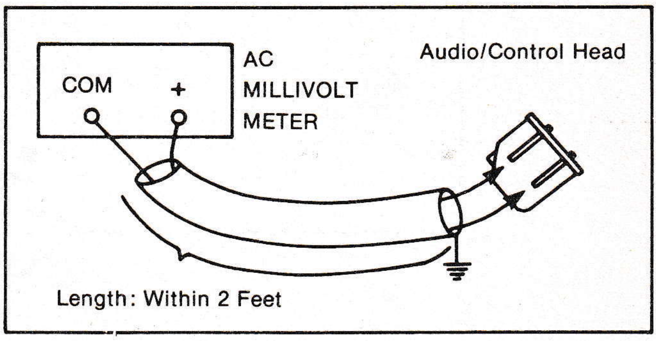


Fig.E57

10. AUDIO PLAYBACK LEVEL ADJUSTMENT

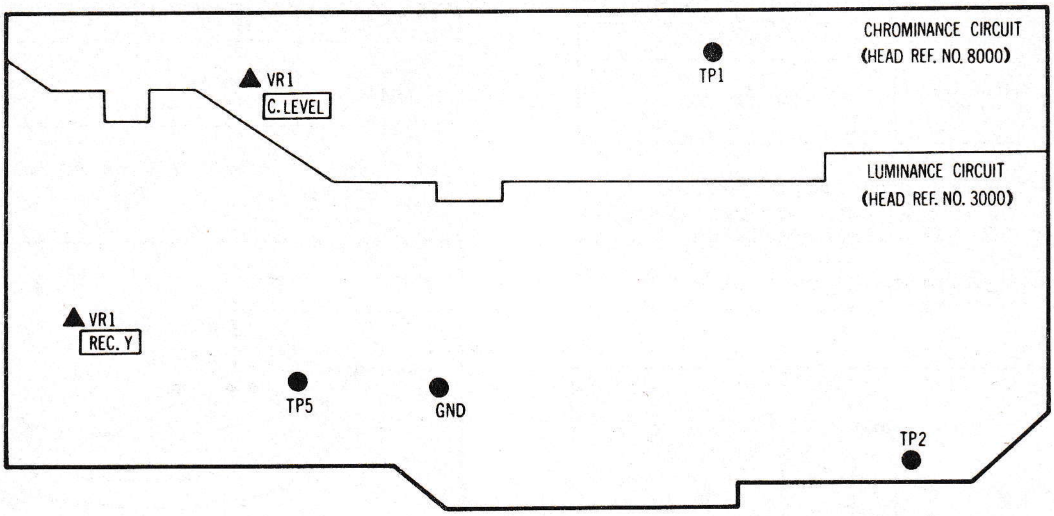
TP	ADJ.	MODE	INPUT
LINE OUT	VR4001	SELF RECORDING	1kHz. −80dB AUDIO SIGNAL/ VIDEO SIGNAL
TAPE	**M. EQ.**	**SPEC.**	
BLANK TAPE	SIGNAL GENERA-TOR/D.V.M.	PLAYBACK SIGNAL IS EQUALLED TO RECORDING SIGNAL	

Note:
Before this adjustment, "Tape Interchangeability Adjustment" and "Audio Bias Adjustment" must be completed.

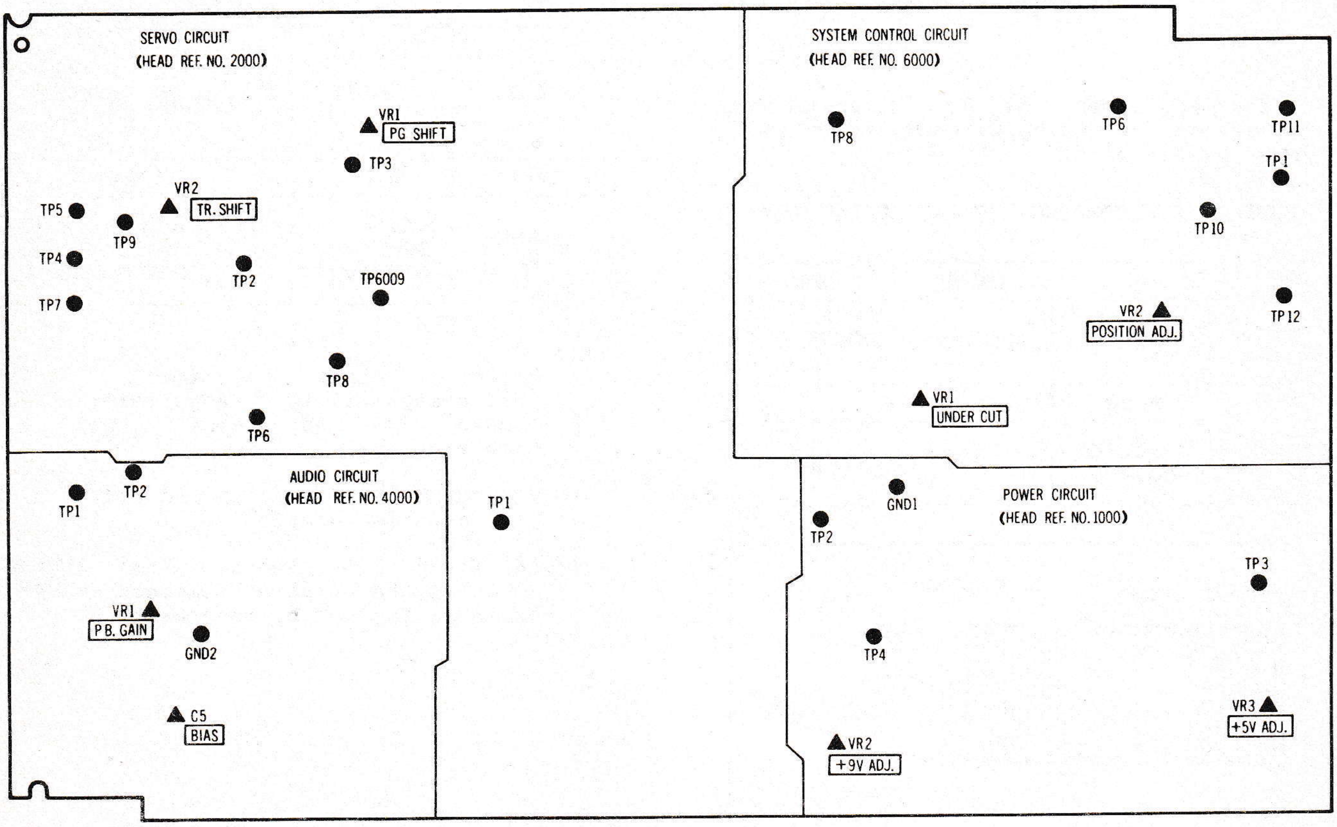
(1).Record a few minutes, and playback the just recorded portion.

(2).Adjust the P.B. level control (VR4001) so that the level of playback waveform is equal to that of recording.

VIDEO SECTION



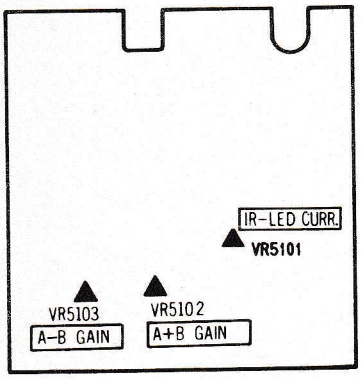
VJBS0352



VJBS0263

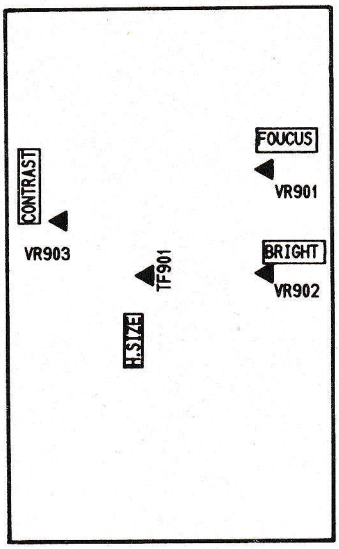
CAMERA SECTION

AUTO FOCUS



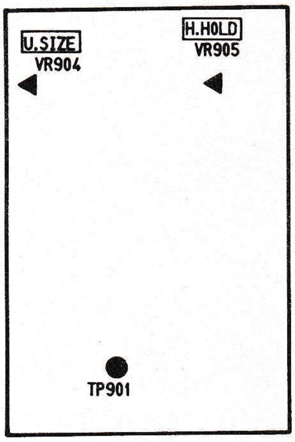
VEPW0490

EVF-(A)



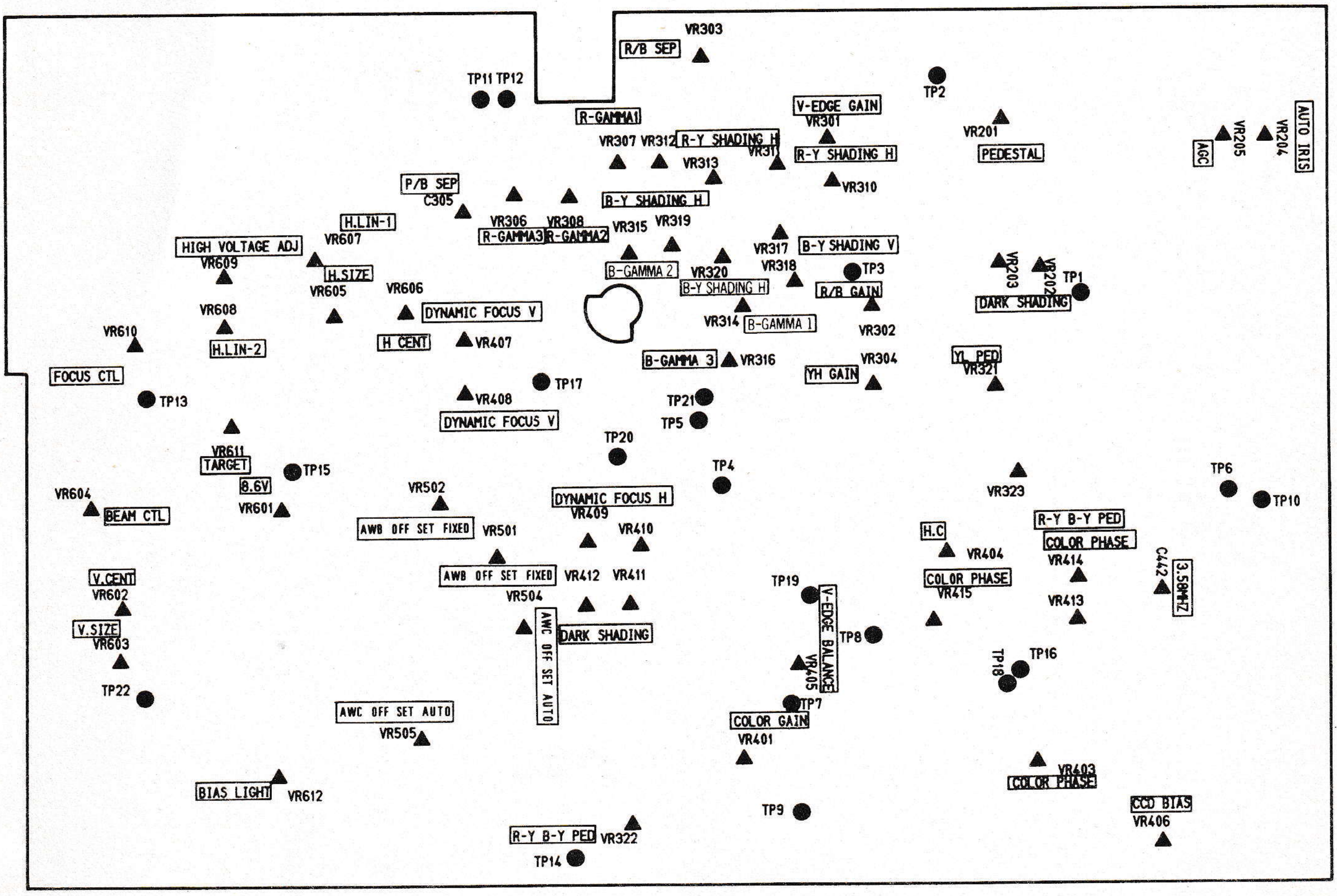
VJBW0455

EVF-(B)



VJBW0456

CAMERA MAIN



VEPW0443